

Forensic Medicine

Toxicology

अगदतंत्र आणल वुवहार आयुर्वेद

इंद्रजित झां
वाइजे

சனவரி 1971

புதுச்சேரி

சென்னை

இந்தியா

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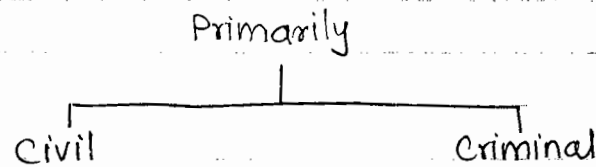
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COURTS AND THEIR POWERS

Types of courts :-

C	C	C	C
i	r	o	o
n	n	n	R



1. Civil :-

eg. inheritance disputes
 compensation
 land disputes
 Family disputes
 Divorce

2. Criminal courts:-

Deals with crimes committed as per I.P.C
 eg. Murder
 Assault
 suicide

3. Consumer courts:-

consumer disputes

4. Coroner's court

Was only in Mumbai

Dealt with inquest only.

presently no coroner's court in India.

Major punishment authorised by law (sec 53-IPC)

- i. Death sentence (capital punishment)
- ii. Life imprisonment (Approx-20 yrs)

CRIMINAL COURTS IN INDIA - (5)

1. Supreme Court :- Highest judicial tribunal in India (@ New Delhi)

power:- superintendence over all other courts in India.

2. High court:-

state level

Power:- superintendence over the courts in that state.

Death sentence passed by session court is confirmed by High court.

3. District session court:-

District level

Death sentence passed should be confirmed by the high court.

4. Assistant session court:-

Also situated at district Head quarters

can't award :- Death sentence
Life imprisonment
Imprisonment beyond 10 years.

5. Magistrate's courts:- (4)

New Delhi)

Magistrate:-

E J S J

i. Executive:-

Head - collector. (District Magistrate)
office work only.
rarely - as magistrate.

eg. boundary disputes
water supply disputes.

ii. Judicial Magistrate:-

Duty:- To record evidence &
pass judgement.

class I - chief judicial magistrate
(CJM) = Metropolitan city
↓
CCM

SDM = sub divisional Magistrate

others = JMFC

Judicial Magistrate First Class

Powers (sec. 29 cr P.C)

Judicial Mag

Imprisonment

Fine

Class 1

CJM / CMM

7 yrs

No limit

SDM / JMFC / MM

3 yrs

RS. 5000

Class II J.M

1 yrs

RS. 1000

1 year only.

iii. Special Magistrate:-

1 year

load

enquiry - in limit

dowry death - dying declaration

May be Judicial / Executive

I. For 1 year only

II. When regular magistrate cannot cope up with load of work.

III. Enquiry is to be finished within a particular time limit.

In all cases of dowry death, dying declaration has to be recorded by special executive magistrate.

iv. Juvenile Magistrate:- $\left\{ \begin{array}{l} \text{B-16} \\ \text{G-18} \end{array} \right\} \frac{1986}{\text{B.G.}}$

Ladies

usually ladies

guilty - sent to reformatories

Boy - (16) years

Girls - (18) years

} As per Juvenile Justice Act - 1986

Testimony sworn

WITNESS साक्षीदार.

① simple ② Hostile

③ Expert

Defn:- Who give evidence on oath, in court.

sworn testimony

TYPES

i. simple / ordinary / common

ii. Expert / skilled

iii. Hostile / adverse / unfavourable

Hostile perjury

D
SE

Doctors - acts as both simple & expert

(I) simple:-

witness who narrates in the court, what he has himself seen, heard, or perceived.

Direct knowledge rule or 1st hand knowledge rule.

(II) Expert:-

Witness who is skilled in some particular field.

e.g. Medical officer ✓
chemical analyser ✓
Finger print Expert ✓

Oath administration: = शपथ घेणे.

Even if person/witness taking lie

↓
crime of perjury

S. IPC 193

tpm

(III) Hostile / adverse / unfavourable witness:-

witness - bad, animus

Hostile or unfavourable to his

own party.

Hostile - 101
perjury - 193

He may lie in court

such witness may be declared as -

Hostile

Re-exam
cross-exam
direct
court question

Recording of evidence:-

1. Examination in chief (Direct examination)
2. Cross examination
3. Re-examination
4. Court question.

Examⁿ in chief

pt 1 - Leading question are not permitted.

pt 2 - Leading question are permitted.

cross exam

acts as double edged sword.

2.

X

X

pt-3 - Leading questions are not allowed.

Re-exam

PROCEDURE OF COURT

S.O.R

includes

1. summon
2. Oath administration
3. Recording of evidence

SUMMON / SUBPOENA

under

penalty

summon = (to) call

sub = under

Poena = Penalty

sec 174 IPC

sec 84 CrPC

Summon defn:-

Written in duplicate and signed by the presiding officer of court, compelling the attendance of a witness in the court, under penalty - witness

sec 174 IPC & sec 84 CrPC

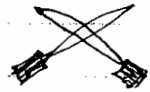
OATH Administration:-

solemn affirmation

In case, the witness has some religious scruples, (atheist) he is required to make solemn affirmation

cross examination acts as

" double edged sword "



INQUEST (माझी)

In = in

quasitus = to seek.

To seek into i.e. to look into
i.e. to find out.

Defn:-

Judicial or legal enquiry into the cause of unnatural death.

Types of Inquest:-

USA - Medical examiners system.

INDIA - depending upon officer who

* Types - (3)

1. CORONER'S INQUEST

2. POLICE INQUEST

3. MAGISTRATE

1. CORONER'S INQUEST

Defn:- inquest carried out by the coroner.

coroner's inquest was prevalent only in Mumbai.

(stopped in Calcutta)
since 1988

Was best inquest in India

stopped in Mumbai since July 26, 1999

Powers:-

① He can't impose punishment.

② only work is enquiry.

2. POLICE INQUEST

(As per sec. 174 Cr. P.C.)

carried by Police officer, not below the rank of head constable.

Commonest inquest in India

"Panchanama" - With the help of two local respectable witness (known as panchas/
panchayatdars)

पंचायतदार

3. Magistrate Inquest:- Sec. 176 Cr. PC.

Defn:- Inquest carried out by an Executive magistrate.

In case of Dowry Death:-

Death of married female < 30 years

Death within - 7 years of marriage -

MEDICAL EVIDENCE

Evidence:- written documents and oral statements on oath, which help the court to decide a case

TYPES OF MEDICAL EVIDENCE - (3)

1. Written / Documentary - 4

medical
certificate

Medicolegal
reports

Dying
declaration

Dying
deposition

2. Oral / Parole

Direct

Indirect

3. Circumstantial

Issuing false certificates is punishable
under section 197 IPC.

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DEATH CERTIFICATE

By RMP (Registered Medical Practitioner)
within 24 hours of death.

Dying deposition

Dying declaration.

(Not followed in India)

defn:- deposition made by person
likely to die because of
some unnatural act.

written or verbal
statement made by person
likely to die because of
some unnatural act done
on his body.

More important
To magistrate

Causes:-

ORAL EVIDENCE/ PAROLE

Defn:- evidence given orally (spoken words)
under oath, in the court

Types:- (2)

Direct

Direct knowledge
of facts stated

Indirect (Hearsay)

Indirect knowledge i.e
known details from others.

1860

1860 - IPC formed.
1861 - CrPC

1908 - CPC

1 EA - 1872
(Indian Evidence Act)

Res Gestae:-

गुहा
उ घडत्यानंतर
लेख

Remarks made by the victim at the time of or immediately after crime are admissible as evidence.

Circumstantial Evidence:-

evidence collected from the circumstances or surroundings of case.

MCI - Established in 1934. ??

34

34
tp MR

MCI act revised in 1956

5 times

1964

1983

1999

2002

Medical Ethics:-

Earliest oath = Hippocratic Oath.
(code)

Modified by World Medical Association.
was named as

"Declaration of Geneva"

CODE OF MEDICAL ETHICS:-

WMA - Sept 1948

Modified by World Medical Association in sept 1948

was called - Declaration of Geneva.

It was amended at sydney-1968

Case upto - 20 lakh → district consumer
20-100 lakh → state forum
> 100 lakh → National forum.

Any deviation from these - unethical practice.

← CONSUMER PROTECTION ACT - 1986 → CPA
COPRA 1992
medical service add.

Second opinion → M.T.P beyond 12 weeks

Frivulous - False complaint - 10,000/- ₹
False complaint

PROFESSIONAL MISCONDUCT (infamous conduct)

Defn:-

As per sir. Donald Mac Alister - 1892

Lord Scrutton

SMC:-

control over professional misconduct
is primarily maintained by SMC.

PROFESSIONAL NEGLIGENCE

(MALPRACTICE) MALPRAXIS

Defn:-

- Lack of reasonable care
- skill
- knowledge

Lord Baron Alderson - An act of omission.

Actions:-

- ① Warning
- ② Eraser of Name from medical Register = penal eraser
 - Temporary = suspension

Res judicata:- case - decided in court

cannot reopened in another court. ✓

एक ही घटना के लिये जजों पर तब
होगा नहीं.

Res ipsa Loquitur :-

It speaks for itself.

In certain situations negligence of doctor
may be self evident.

Types:- (Professional Negligence).

1] Civil Professional negligence →

2] Criminal professional Negligence →

* Civil P.N ⇒ take case to civil court for
compensation

* Criminal P.N ⇒ take case to criminal court for
punishment

Case → Tried by JMFC under IPC-304 A
MOR A

• vicarious responsibility :- Let the master answer.

DISPOSAL OF MEDICAL RECORDS:-

1. NON MLC:-

OPD records have to retained for - min 3 years

IPD records → minimum 5 years
E(इ) - 5th letter.

2. MLC

No specified time limit

They should be retained;

CPA

1992

medical
service
add.

KS

392

+

base

professional secrecy

If - convict → details of his health
should be revealed to
jailor or jail superintendent.

IN court of Law:- Nothing is secret

Full details of patient - revealed.

CONSENT

defn:- Agreement or compliance. (s 13 ICA)

(AS per sec. 13 of Indian Contract Act)

Types - ④ I E W B

① Implied consent = presumed to be there

② Expressed consent

④ oral

⑥ written

③ Written informed consent = therapeutic privilege

④ Blanket consent = consent taken

on printed form

→ legally not consent

Euthanasia = mercy killing.

Active

Passive

voluntary involuntary

producing painless death
in hopeless patient.

IDENTIFICATION

* living & dead

Types:-

complete



exactly pinpointed

Partial



cannot be exactly pinpointed.

Medicolegal Rule:-

sec 53(1) Cr. PC

Reasonable force can be used if the examination is refused by an accused.

* CORPUS DELICTI

Dead body - Homicide ~~delet~~ -
including clothes ✓
photographs ✓
weapon/object found on body

Dactylography:-

Best system of identification till date

Teeth:- (Dental status)

Turn 2

considered as second best.

RACE:- Known from

CCHLIB

1. clothes

2. complexion

3. Hairs

4. Lips

5. Iris

6. Bones

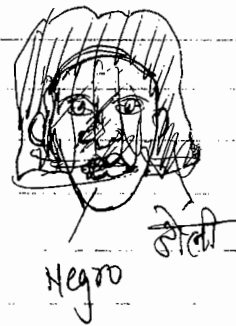
$$CI = \frac{3113a}{391} \times 100$$

$$\text{Cephalic Index} = \frac{\text{Max. breadth of skull}}{\text{Max. AP length of skull}} \times 100$$

I] Dolicocephalic - Negroes

$$CI = 70 - 74.9$$

Long Headed people.



II] Mesaticephalic:-

$$C.I = 75 - 79.9$$

Chinese

Europeans

Indians.



III] Brachycephalic:-

$$C.I > 80$$

short headed people

Mongols.

SEX

Signs of sex:-

3P

1. Positive or confirmatory
2. Probable =
3. presumptive

1. Positive or confirmatory:-

eg. Functional testes (by semen ejaculation)
functional ovaries (by menstruation)

Nuclear sexing & chromosomal pattern study:-

Before puberty and doubtful cases.

2. probable $\Rightarrow$ presence of penis & scrotal sac - Male
vagina & breast - Female.

3. presumptive signs:- Facial Features
Head Hairs.

NUCLEAR SEXING:-

Defn:- study of Nucleus
in non-dividing cells of body.

principle:-

barr body $\rightarrow$ 40% of cell (female)

single
inactive
condensed - x-chromosome

Chromatin positive:- जो बार मध्ये जातो तो (+ve)
person with barr bodies

Davidson body:-



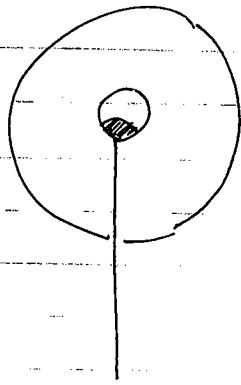
drum stick
like projection from
lobe of nucleus

In about 10-40% of
polymorphonuclear cells of
female -

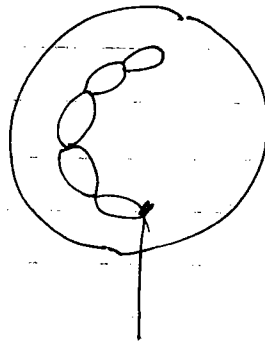
Drum stick like projection from
lobe of nucleus.

Nuclear sexing - Non
dividing cells
chromosomal - Dividing

IN MALE: - Barr bodies } Absent.
Davidson's bodies }



Barr body



Davidson body.

CHROMOSOME PATTERN STUDY (Karyotyping)

defn- study of pattern of chromosomes,
for determination of sex.

↓
dividing
cells

Nuclear staining

Non dividing
cell.

principle:-

Female — 44 + XX

Male — 44 + XY

23 pairs.

Y-chromosome — fluorescent to
chemical quinacrine.

Variation from Normal sex:-

- Due to => Defective foetal development.
- Defective hormonal influence.

INTERSEX STATES

Physical
Reproductive or
sexual behavioural intermixing 2 sexes.

classification

1. Gonadal ^{absence}genesis → 44+0 - absence
2. Gonadal dysgenesis → 2nd sexual (X) - defect
 - 2nd - Ovarian dysgenesis (Turner's syndrome)
 - Testicular dysgenesis (Klinefelter's syndrome)
3. Hermaphrodite

TURNER'S SYNDROME :-

Due to ovarian dysgenesis

pattern :- 44 + XO
(Total 45 chromosomes)

Women :- synthetic women

Chromatin - Negative. ✓

✓ characters:-

- I. sexual infantilism (infant like sex organ)
- II. short stature
- III. congenital abnormalities.

Male TURNER'S SYNDROME ⇒ Noonan's syndrome. ✓

KLINFELTER'S SYNDROME

Due to testicular dysgenesis

Male - Not develop typical secondary sexual characters.

As - synthetic Male

pattern:- $44 + XXY$ (47 chromosomes)

Rarely:- $44 + XXXY$ (48 chromosomes)

$44 + XXXY$ or

$44 + XXXXY$ (49 chromosomes)

chromatin positive.

characters:-

i. sexual infantilism -

ii. Gynaecomastia

iii. Eunuchoid features.

HERMAPHRODITE

[Hermes = Messenger of God
Aphrodite = Goddess of Love]

person - has external or internal intermixing of sex organs, and therefore the external sex organs may be of one sex. while gonads are of other.

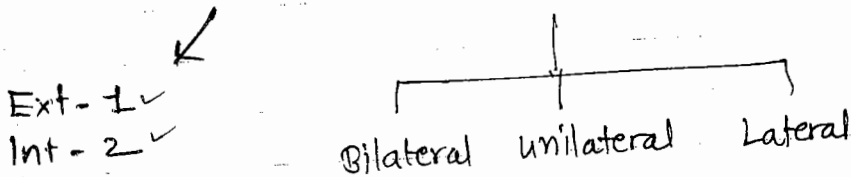
pattern - XX or XY

Result condition:-

- defective development of gonads or
- defective influence of maternal androgens.

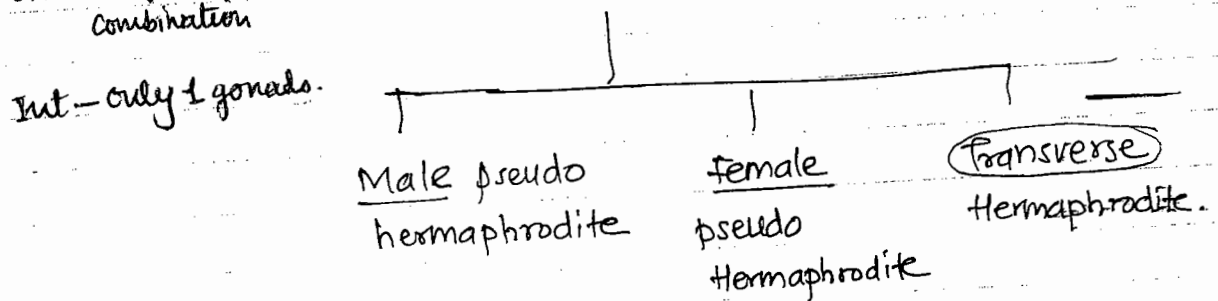
Types:-

1. True hermaphrodite = double sex
2x sex.



Ext - any combination
Int - only 1 gonads.

2. pseudo hermaphrodite (False/spurious)



* pseudohermaphrodite:-

Breast present only in female

internally - gonads of only one sex

of

hile

AGE

Forensic odontology:-

The branch of forensic medicine that deals with study of teeth

- i. Teeth
- ii. Height and Weight
- iii. changes at puberty and old
- iv. Bones.

i) Teeth:- No of teeth
No of erupted
Root calcification

Temporary

6 month - 6 years

No - 20

Incisors - 4

Canines - 2

Molars - 4

(premolars)

I C M

4 2 4

permanent

6 year onward

No - 32

Incisors - 4

Canines - 2

Molars - 4

premolars - 6

bicuspid
premolar - 6
molar - 4

tricuspid

I C P M
4 2 6 4

Hutchinson's teeth

Hatchin (Hutchinson's teeth)

Teeth may present at birth = syphilis.

Mixed dentation = 6 - 12 yrs

Age from teeth after 25 yrs. - Methods

1. Gustafson's
2. periodontosis
3. Root Reabsorption
4. Root transparency
5. Mile's method
6. Boyde's method
7. Stac method

G.P.A.T.M.B.S

ii) Height and Weight: = Hess's Rule - Age from length

Age from Length
~~Age~~

upto 5th lunar month gestation = $\left(\frac{\text{gestational month}}{\text{month}} \right)^2$

upto beyond 5th month = $5 \times \text{gestational month}$.

length upto 25 cm : $\text{age} = \sqrt{\text{length}}$

length more than 25 cm = $\frac{\text{length}}{5}$

Age from bones: - (ossification Test)

ossification $\rightarrow$ lower end of femur

starts $\rightarrow$ upper end of Humerus & tibia



Bicuspid
molar-6
molar-4
Tricuspid

Routinely x-ray:-



* childrens — wrist and hand

Adults — shoulder
elbow
knee
pelvis

old — skull
vertebrae
sternum.

Mandible :-

$\angle 140^\circ$
infant

obtuse angle = 140° (infant & old)

$\angle 110^\circ - 120^\circ$

Right - Adult = $110^\circ - 120^\circ$

Billowing:-

3

Between 20-30 yrs

irregular

wave transverse ridges appear on pubic
symphysis surface.

Medicolegal aspects of age:-

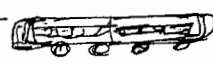
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1. Criminal responsibility - IPC 82

< 7 yrs

Child below 7 yrs not
responsible for any crime.

IPC - 83 :- child betⁿ 7-12 yrs is
normally held punishable.

IPC - 82 - < 7 yrs - Not punishable
 83 - 7-12 yrs - punishable
~~84~~ - < 7 yrs - punishable - Railway Act 
 87 - < 18 yrs - consent X
 89 - < 12 yrs - consent X

< 7 yrs - punishable

Under Railway's Act → child below 7 yrs is punishable.

ENGLAND :- child below upto 14 yrs -
 Not held responsible for crime.

2. Consent:-

IPC. 87 ⇒ child below 18 yrs
 cannot give consent for
 any act.

IPC. 89 ⇒ child below 12 cannot give
 consent for an act done in
 good faith.

child above - 12 ↑ → consent for M.E.
 except MTP Act - 18 years
 major surgery

3. Judicial punishment:-

capital punishment is not given below 18 yrs.

juvenile offenders → sent to reformatories.

4. Competency as a witness:-

sec 118 I.E.A ⇒ No age limit & any
 child who can understand
 question can reasonably
 answer it.

As witness.

sec 118 Indian Evidence
 Act.

Employment:-

Min. Age

1. Govt. service — 18 yrs.
2. senior Govt — 21 yrs
3. MP/MLA — 25 yrs
4. Governor/
Vice president/
president — (35) yrs.
5. Retirement — 50-65 yrs

Under Factories Act:-

Adult $\Rightarrow$ Above 18 $\uparrow$

adolescent $\Rightarrow$ 15-18 yrs.

child $\Rightarrow$ Below 15

children cannot employed in factories.

(shops) $\Rightarrow$ 12 $\downarrow$ cant

mines $\Rightarrow$ 17 $\downarrow$

Liquor cant
sold $\Rightarrow$ 16 $\downarrow$

Kidnapping:-

sec 361 - 373 IPC

girl $\Rightarrow$ < 18 yrs
boy $\Rightarrow$ < 16 yrs

sec 361 - 366 IPC

361
373

Intention

Age

i) To Remove property

< 10

ii) Illegal sexual intercourse

< 18 yrs

(S. 366A
372
373 IPC)

iii. import/export girls

< 21 yrs.

S. 366 B IPC

MUHS-15

RAPE

- S. 375 IPC. → Definition ✓

S. 376 IPC → punishment is given.

Impotence:-

inability to perform or take part in sex.

Female - 18 (legal potent)

Sterility:-

inability to procreate or
conceive a child

Girl before puberty & after menopause
Boy before puberty.

* CRIMINAL Abortion /MTP:-

Beyond 20 weeks.

MTP:-

1 RMP = upto 12 weeks gestation

2 RMP = betn 12 to 20 weeks

Not done = After 20 weeks.

Infanticide:-

210 days

* Viable foetus $\Rightarrow$ 28-30 weeks OR
(Capable of independent existence) (210) days

infanticide $\Rightarrow$ After ^{28-30 wks} viability upto
1 year after birth.

DAG

Medicolegal aspects of different ages:-

chart - xerox

After 28 weeks — foetus born but no signs of life - Still birth

Bertillon's system

ANTHROPOMETRY - Bertillon's system of identification.

Anthropos = Human ✓
metron = measurement ✓

principles:

Body measurement $\Rightarrow$ Not change after 21 yrs.

study include:

① complexion facial features
photographs.

② Body peculiarities - eg. scars
moles &
deformities.

③ Body measurements.

DACTYLOGRAPHY = Finger print study.

DAGA

Galton's system of ID.

Henry - Galton system of ID.

Best system till date.

Defn:-

papillary / epidermal ridges $\rightarrow$ specific pattern

Discovery:-

1858 - W.H

F.P discovered by - I.C.S officer

1892 - systemized

William Herschel (1858)

study systemized by - Francis Galton

principle:-

- Constant from birth to death.

Quetlet's Rule

दोघोंकी same
cutlet नहीं जायचे.

- No 2 individuals have same pattern :-

Quetlet's Rule

- F.P Not inherited

Taking of F.P:-
plastic print - latent
PLAIN PRINT
plain rolled

1) Plain :- plainly pressed.

2) Rolled :- Rolled from one to other side.

eg. police department -

10 fingers = rolled
habitual criminals.

unidentified bodies

3) Latent :- print left on cloth, paper.

4) plastic print :- print left on soft
surface
eg. soap, cheese.

Types of F.P (Galton) ALWC

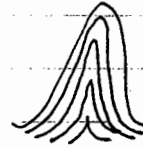
- | | | | |
|---|---|----------------------|-----------------|
| A | } | ① Arch | ⇒ <u>Common</u> |
| L | | ② Loop | |
| W | | ③ Whorl | |
| C | | ④ composite/compound | |

ARCH

incidence := 6-7 %



Arch



Tented Arch.

LOOP

- commonest type in DHS

incident: - 65-67 %

Depending upon direction of slant loop

Types - 2

ulnar loop

Radial Loop

95% - ulnar

slanting towards
ulna

slanting towards
Radius (Thumb)

loop

core

delta

central

top - rods

unite - staple



For comparison - (16) points of F.P taken in India.

^{sweat}
POROSCOPY :- Lecard's system of I.D.
^{pores} comparison of Number, sizes distribution of pores & sweat.

^{lips}
QUEILOSCOPY :- cheiloscopy.

study of lip prints.

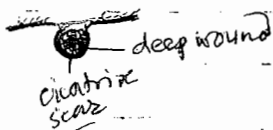
FOOT PRINTS:-

To avoid interchange of babies in Hospital.

SCAR

(CICATRIX)

Defn:- fibrous tissue covered by epithelium results as consequence of healing of deep wound.



Characters:-

- i. Fibrous tissue
- ii. absence of elastic tissue, sweat glands hair follicles
- iii. Hypo / Hyperpigmented
- iv. Flat / Raised

BCG
syphilis
TB

scar

Scar - extent of injury & weapon used.

Wounds

1. Incised

2. Stab

- both edges sharp

- one edge sharp

- Δ or object

- circular

3. Firearms

4. Lacerations

5. Burns

6. Soft parts

Scar

Linear / elliptical

elliptical scar

wedge shaped

star scar

circular

circular or depressed

wide or irregular scar.

Keloid

irregular scars.

* Age of scar

1. Bluish or reddish $\rightarrow$ 5-6 days.

2. Vascular to Nonvascular $\rightarrow$ 2 wks - 2 months.
so pale/white

3. Tender to Nontender $\rightarrow$ 2-6 months.

4. Soft to hard & glistening $\rightarrow$ After 6 months.

TATTOO MARKS

Ta = to
Tau = mark.

Defn - Multiple puncture
Needle dipped in dye.

PARTS:- whole body
commonly → forearm / arm
forehead / chest

permanency of tattoo:-

1. More permanent → on covered part

2. Colours:-

- * Black — Gun powder, carbon, ink or soot
- * Red — vermilion. (सिंदूर)
- * Green — chromium compounds.
- * Blue — cobalt salt or prussian blue
- * Brown — ochre.

Ochre

Brochure
ओकर

ochre = an earth pigment
Containing silica, Aluminium &
Ferric oxide.

Medicolegal aspect:-

i. superficial tattoo - upto (10) years.

ii. complications:-

- i. Infection
- ii. abscess
- iii. Gangrene
- iv. AIDS
- v. T.B.

Occupational Marks:-

- i. Rough and horny hand → Labour
- ii. Callosity on lat. margin of tip of Right → clerks.
- iii. Multiple needle marks → Tailors.
- iv. depression on sternum → Cobbler.

DNA FINGER PRINTING / PROFILING

DNA molecules → 99% in chromosomes 99 chromosome

1% in mitochondria. ~~मिटर~~ - 1

बाउंड मिट → Nucleotide

This study — yet to be accepted by courts
as evidence.

usually in Disputed paternity.

HLA Typing:- (Human Leucocyte antigen)

present on WBC ✓
platelets ✓
tissues ✓

HLA types — A B C D

(determined by
chromosome 6)

used:-

disputed paternity

Camel - RBC - biconvex
oval



Sex from BONES

Femur

Male

Head - larger

vertical diameter > 47 mm

angle betⁿ neck & shaft
= obtuse

angle of inclination
with ground = 80°

♀ - Right angle or $<$

Female

small

< 45 mm

Right angle or
is less



About 76°

STATURE (HEIGHT) FROM BONES

Bones are measured on osteometric board
(Hepburn board)

Height:-

Noon & evening $\rightarrow$ 1.5 - 2 cm lesser
decreased elasticity of
Intervertebral disc

living - on lying $\rightarrow$ 1-3 cm more

Length of dead body $\rightarrow$ 2 cm more than
during life.

Height of person $\rightarrow$ span (distance betⁿ
tips of middle fingers in
outstretched arms.

~~✗~~

Ht $\rightarrow$ maximum at 25 yrs

THANATOLOGY

study of death

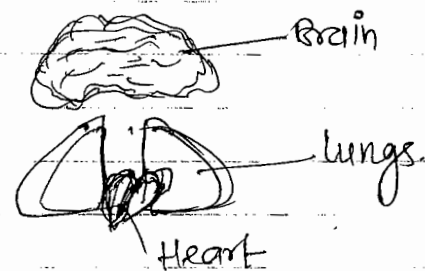
Thanatos = death
Logos = science

Death

irreversible cessation of life,
insensibility, inability to move

Tripod of life: -

Brain
Heart
Lungs



MOMENT OF DEATH

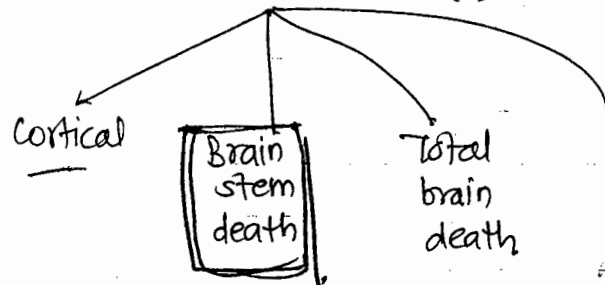
* Earliest criteria → stoppage of respiration.

* Next criteria → stoppage of circulation.

↓
auscultation of apical of lung.
absence of pulse. ~~False~~
Heart beat > 5 min.
नहीं.

* Next criteria →

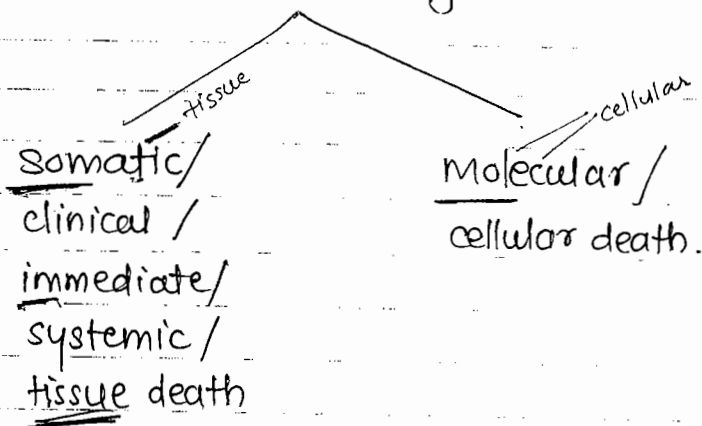
Brain death (3)



* ~~present~~ ^{mp} criteria to diagnose death is - BRAIN STEM DEATH.

STAGES OF DEATH

Shapiro:- 2 stages



1. Somatic death:- immediate signs of death.

Soma = Body

Stoppage of functioning of brain, Heart and Lungs. Tripod

anaerobic enzymatic process - still continuing.

✗ Muscle respond

pupil respond to meiotics and mydriatics.

2. Molecular death:-

after somatic death

death of all individual cells. ✓

muscles → No response

pupils → No response



pupils

No Response.

molecular death = complete death.

~~100%~~
100%

EARLY SIGN:-

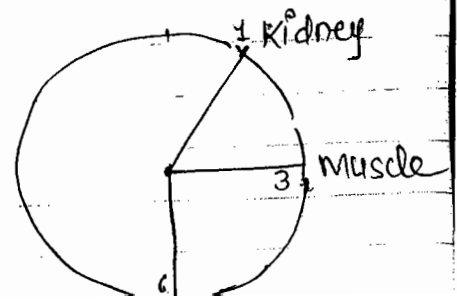
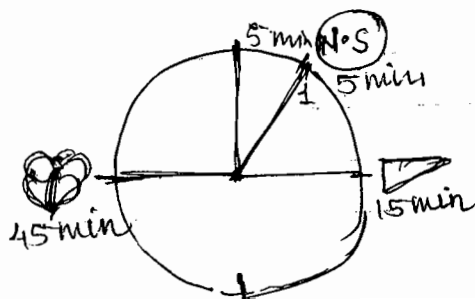
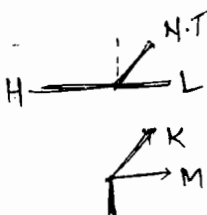
- ① changes in eyes
- ② ~~++~~ skin
- ③ cooling of body (ALGOR MORTIS)
- ④ PM lividity (LIVOR MORTIS)
- ⑤ changes in muscles. (RIGOR MORTIS)

LATE SIGNS:- D AM

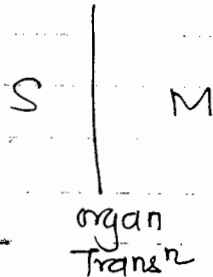
Decomposition /
Adipocere formation /
Mummification.

Molecular death occurs at varying intervals after somatic death.

1. Nervous tissue — After 5 min
2. Liver — After 15 min
3. Heart — After 45 min
4. Kidney — After 1 hour.
5. Muscles M-3 — After 3 hours.
6. Cornea — After 6 hours
7. Blood — After 6 hours.



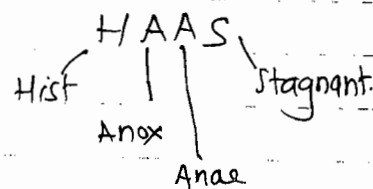
organ transplantation → done after somatic but before molecular death.



MODES OF DEATH (proximate causes of death)

* As per Gordon - (4) modes

1. Anoxia anoxia
2. Anaemic anoxia
3. Stagnant anoxia
4. Histotoxic anoxia



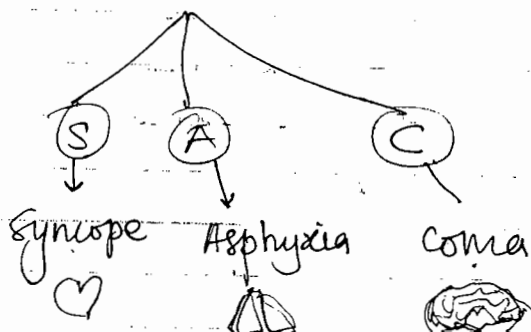
* As per BICHAT - (3) modes



1. Coma - brain
2. Syncope - Heart
3. Asphyxia - Lungs

बिचट
1 2 3

= left chambers of Heart full



Syncope - causes.

Anaemia

both chambers
empty.



Asthenia

↓
weakness of
muscle of Heart.



both full

Also in Burn

N. shock / primary shock /
vasovagal shock /
vagal inhibition /
Reflex cardiac arrest.

SUDDEN DEATH

Defn:-

Death - either not preceded by
any manifestation

occur within 24 hours. - MLC

Types

Natural

Unnatural

causes of sudden natural death:-

1. CVS = 45 - 50 % ✓
2. RS = 15 - 30 % ✓
3. CNS = 10 - 20 % ✓
4. Abd. cause = 10 - 15 % ✓

Iatrogenic → caused by doctor.

SIGNS OF DEATH

- 1] Immediate (somatic)
- 2] Early (3-24 hrs)
- 3] Late (After 24 hrs)

I] Immediate :-

- i. permanent and complete cessation of function of brain & flat EEG.
- ii. Heart & flat ECG.
- iii. Functions of lungs.

Tripod

II] Early signs:- (Appear after 3-24 hrs)

ESALR.

- ① changes in - eyes ✓
- ② - skin ✓
- ③ cooling of body = Algor mortis
- ④ PM lividity = Livor mortis
- ⑤ changes in muscles = Rigor mortis

opthal
Retinal blot

1-2 hr at
2-3 hr

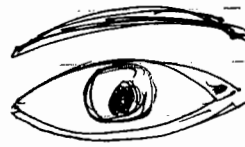
7-8 h.

III] Late signs:- (After 24 hours)

Decomposition (putrefaction) or
Adipocere formation (saponification)
mummification.

EARLY SIGNS OF DEATH

① changes in eye:-



N $\geq$ 14-25 mm of Hg.

IOP :-

Normal = 14-25 mm of mercury.

After death = 12 mm of mercury.

after $\frac{1}{2}$ hour = 3 mm of Hg
2 hr = 0 mm of Hg

pupils:- dilate after death
(Normal size - 5 mm)

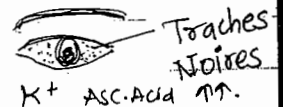
For - 1-2 hours $\Rightarrow$ Respond to
meiotics &
mydriatics.

After 2-3 hours $\Rightarrow$ shape changes to
oval, Δ lar or
polygonal.

ophthalmoscope
Retinal blood vessels
1-2 hr after death - dotted
2-3 hr $\rightarrow$ segmented
(Rail Road)
3 hr $\rightarrow$ optic disc = pale

Sclera:-

Brown pigmentation - Traches noires
(deposition of dust on sclera)



Level of potassium & Ascorbic acid in
vitreous humour. $\uparrow\uparrow$ glucose & Na $\downarrow\downarrow$

Skin — Crayish white.

cornea — before death:- hemia methylas narcotic pos

after death not at all

* COOLING OF DEAD BODY (ALGOR MORTIS)

Defn:- Body loss heat by

- conduction
- convection
- radiation
- evaporation ✓

Cd
CV
R
E.

No cooling occurs - if atm pressure is
if $atmp > bodytemp$ high than body temp.

sure sign of death = $10^{\circ}C$

Measurement of temperature in dead body:-

Instrument $\rightarrow$ chemical thermometer
containing alcohol

length - 25 cm

graduation - $0 - 50^{\circ}C$

inserted - 10 cm deep in Rectum, Nose, vagina

Time - 2-3 minutes

Time since death = $\frac{\text{Normal rectal Temp} - \text{observed Rectal Temp}}{\text{Rate of fall of temp / hour}}$

Rate of cooling in India = $0.5 - 0.7^{\circ}\text{C} / \text{hour}$.

Time required for cooling:-

Body starts $\rightarrow$ 1-2 hrs
(After)

External - atmospheric pressure in 12-15 hrs.

Internal - internal body parts $\Rightarrow$ 18-24 hrs

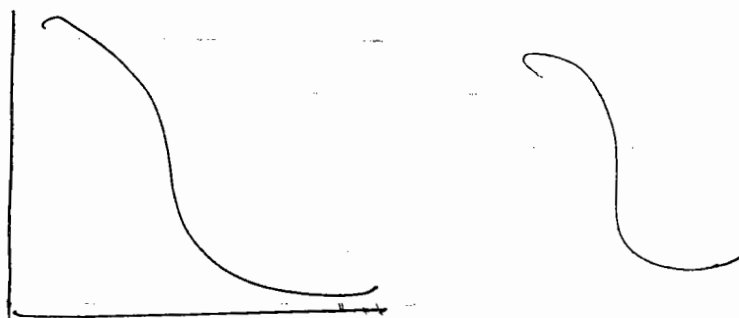
conditions

Initially (before molecular death) = Rate of cooling
Less

Within 3-12 hrs = very fast cooling

After 12 hours = very less

curve $\rightarrow$ SIGMOID CURVE ✓
of cooling (inverted 's' shaped)



IN sudden death — slow

chronic disease — faster

cooling (10) times faster — In strong air

— dry weather

Rate of cooling:-

WAB
4 2 1

* Water : Air : Buried

4 : 2 : 1

IMP

PM calorificity

Defn :- In some situations, for initial 2-3 hours
dead body — gains heat then cools

conditions:-

i. Due to metabolic processes

ii. Bacterial & viral activity

iii. extreme muscular activity.

VIRAL — Rabies

IN — ✓ convulsions

✓ tetanus

✓ strychnin poison

✓ alcohol

✓ CO.

electric current

(internal energy)

POST MORTEM LIVIDITY

पर्याय:- LIVOR MORTIS / pm staining / cadaveric lividity
subcutaneous hypostasis / vibices / Darkening of
sugillation death.

Defn:-

Stagnation of blood to dependent parts of body -

Staining:- Bluish purple

conditions

Contact pallor:- No lividity seen on pressure points of body.

Drowning :- (Head) is dependent part.

Contact flattening:- supine position



No lividity occurs on occipital area, shoulders, buttocks & calf.

vibices:-

No lividity - on parts tightly tied with belt, neck tie, waist band, brassiere

Running water - no fix site

No lividity seen on Heart as cardiac muscle are very thick.

Time required for PM staining:-

* start after 1 hour of death.

* small discoloured patches -

(1 hr)

4/8/2022

COLOUR OF PM Lividity

mona ke cherry
estimation

Co. poisoning

In burns & cold

cyanide

opium poisoning

H₂S

Hydrogen sulphide
poisoning

potassium chlorate
poisoning

phosphorous

Nitrates

Asphyxial death

Haemorrhage/
anaemia

colour

bright cherry red

bright red

pink

almost black.

bluish green

बिग हस
H₂S

chocolate / coffee brown

dark brown

माचिस की काडी

Reddish brown.

निविश

dark bluish violet

cyanosis

pale purple

D.D : → 1. congestion of viscera

2. Bruise / contusion.

Medicolegal Importance:-

Helps us to know position &
posture of dead body.

CHANGES IN MUSCLES

RIGOR MORTIS

(cadaveric rigidity / death stiffening)

Rigor = contraction or stiffening
mortis = death

- | | | | |
|---|-------------------------------|-------------------------------|-------------------------------|
| [| 1] Primary Relaxation | (Alkaline) - last for 2-3 hrs | |
| | 2] Rigor / cadaveric rigidity | (Acidic) | ↑ till molecular death occurs |
| | 3] Secondary Relaxation | (Alkaline) | occurs |

RIGOR MORTIS:-

Contraction, stiffness, shortening of muscle after death.

Mechanism:-

ATP - Responsible for elasticity and plasticity of muscles

ATP → dephosphorylation



ADP & phosphate + large amount of energy



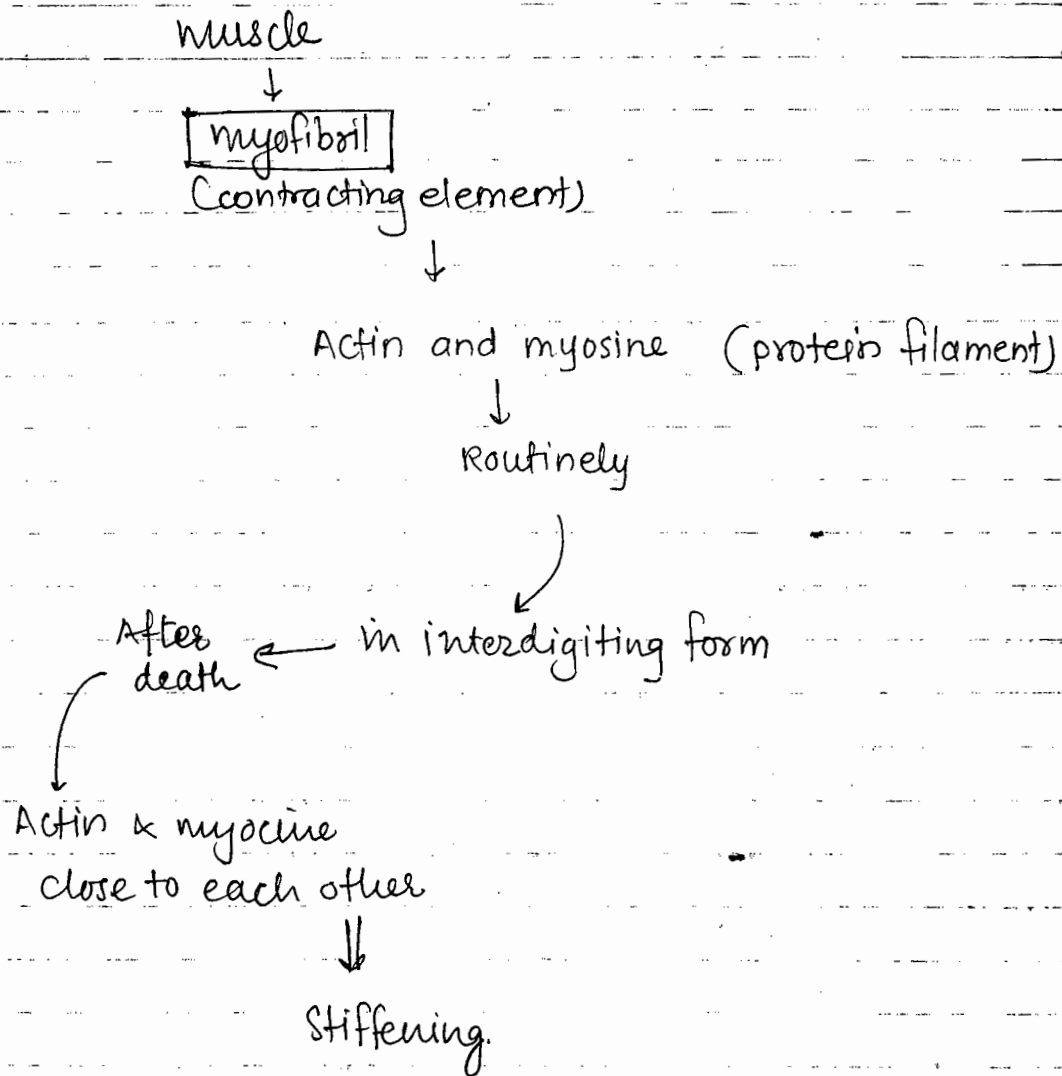
used for muscle contraction

Muscles involved:-

All muscles of body i.e. involuntary & voluntary go into rigor.

(Except paralysed limbs)

Mechanism:-



marks } ATP required — after death.

* * ATP reduced below 85% — Contraction starts.

below 15% — fusion of actin & myosin

sequence ⇒ Involuntary

↓
voluntary

↓
eye lid

↓
gel like
appearance

H-

C-

last

②

Time Required:- 12 Rule

Start appearing $\Rightarrow$ 2-3 hr after death.

fully established in next 12 hr.

stay in body in next 12 hr.

slowly passes off in next 12 hrs.

filament)

Factors influencing Rigor mortis:-

① Age:-

① No rigor in foetus < 7 months.
(No glycogen)

② Rigor present $\rightarrow$ Full term still birth

Early Rigor $\rightarrow$ Gas gangren (Bact. infer)

Immediate Rigor: $\rightarrow$ convulsions

tetanus

strychnin,

Inj. insulin

gas gangren

Glycogen $\downarrow$

Delayed :-

paralysis

ext. haemorrhage asphyxia

starts.

actin &
myosin

H-F

C-D.

Heat - favours Rigor & ~~end~~

cold - delayed.

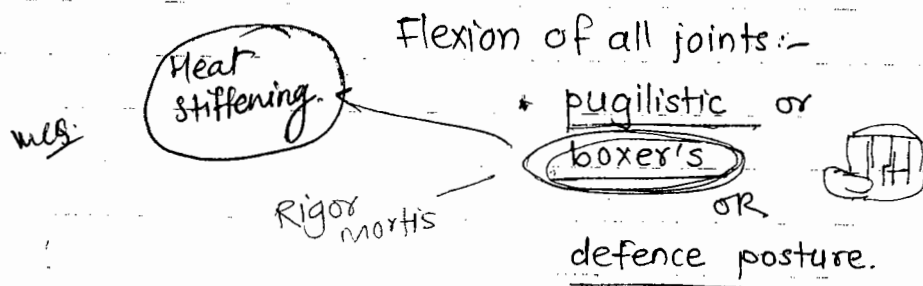
↓
gel like
appearance.

last

D.D of Rigor mortis:-

1. Cold stiffening.
2. Heat stiffening
3. putrefactive (gas) stiffening
4. cadaveric spasm.

Heat stiffening :- temp $> 65^{\circ}\text{C}$



* Cadaveric spasm:- = instantaneous rigor cataleptic rigidity.

impossible to break

Defn:- group of muscles which were in contraction or spasm at the time of death. Continue even after death.

LATE SIGNS - MAP

D	① Decomposition / putrefaction	(P)
S	② Saponification / Adipocere	Air Absent (A)
M	③ Mummification - moisture absent	(M)

① Decomposition

mechanism:- ① Autolysis:- proteolysis
glycolysis
lipolysis.

Bacterial enzymes:-

Chlostridium welchii

Streptococcus

Staphylococcus

B. proteus & E. coli

little extent:- fungi & insects

Necessary conditions:-

Warmth
moisture
air

} essential for decomposition.

Mummification:- In absence of moisture,
dead body dries up &
becomes mummy.

Colour changes:-

Earliest sign of decomposition →  Greenish discoloration.

↓
due to formation of

sulph meth haemoglobin

sulph meth Hb. → Green

Ext → 1st → Right iliac fossa

Int → Liver.



MURK

seen 1st at Right
iliac fossa - externally
& in liver - internally

12-18

24-48

Appears in
spreads in

12-~~18~~ hrs

24-48 hrs



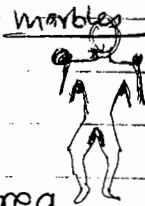
Marbling :-

Hb dissociate from the R.B.C & colour is taken up by blood vessels -

seen as prominent lines having purple, green or brown colour



especially on :- shoulders
axilla
inguinal area.



Time :- in 24-48 hours.

Decomposition :- First in (viscera) then whole body.

Changes:-

pm lividity :- brown & finally black in 48-72 hours.

skin & wounds :- blisters → due to collection of gases in S.C tissue
36-48 hours called putrefactive blisters.

may confused with Scald blisters

skin slippage :- skin becomes loose

48-72 HOURS

2-दिवस = 3-दिवस

Gloves = Hands

Socks = Stock = Foot

degloving &
destocking
3

- skin from hands & feet can be removed as gloves.

imp →

Appearance of maggots:-

1-2 days:- egg changes into larvae.

2-3 days:- maggots seen after 2-3 days after death.

4-5 days:- maggots → pupae
↓ Next 3-5 days
adult fly.

Adult fly → coming out of body after
10-12 days of death.

DECOMPOSITION IN WATER (sequence)

Head → Neck → chest → upper limb
↓
lower limb ← abdomen

Decomposition in AIR (sequence)

Abdomen → chest → Neck → Head
↓
upper limbs ← lower limbs

Rate of decomposition :-

In water = $\frac{1}{2}$ of that in air.

लगरकर

समकाल LATE decomposition →

Factors:-

① Warmth - Ideal temp = 37°C

Retard decomposition } = Temp - 0°C $\wedge$
 $> 50^{\circ}\text{C}$

② AIR - $\downarrow$ air $\Rightarrow$ Adipocere

③ Moisture :- $\downarrow$ $\Rightarrow$ Mummy

* RATE OF DECOMPOSITION (Casper's dictum)

Casper's dictum.

AIR : WATER : Removed from water : Buried

BWAR

1 : $\left(\frac{1}{2}\right)$: 2 : $\frac{1}{8}$

RAWB

Internal factors:- (5) Ext. factor - (6)

Age:- Decomposition is very slow in
still born & new born.
(Body - almost sterile)

Faster $\rightarrow$ children

slow $\rightarrow$ old people

Slow

Fast Double in summer.

• chronic wasting disease

Asphyxial death

• Heavy metal poisoning

Bacterial infection.

• carbolic acid, datura, strychnine

Indrajeet come on

ADIPOCERE FORMATION (SAPONIFICATION)

Adipis = soft fat
cera = wax

Defn:- conversion of dead body into soft fatty, waxy substance.

Modification of decomposition.

Mechanism:-

pM Hydrolysis

Hydrogenation of body fats.



fatty acids

Fatty acids + calcium & ammonium ions



insoluble soaps.

Fatty acid contents of body:-

Normal body $\Rightarrow \frac{1}{2} \%$

In adipocere - after 1 month - 20%
after 3 months - 70%

Essential Requirements:-

1. Absence of air
2. Excess of moisture
3. Warmth.

Sequence:- ~~exterior~~ $\rightarrow$ ~~interior~~

Time:- 3 months $\rightarrow$ 2 years.

Ideal Adipocere formation:- Water

पाण्यात सवति लवकर
Saponification होते.

* Fatty person मध्ये.

Time Required:-

① Same in rigor Adipocere formation does not occur in fetus < 7 months

② Normally adipocere formation occurs in

3-35 days.

smell - Sweetish disagreeable in early stage

Medicolegal importance of adipocere:-

ammonical

- sure sign of death

- Time since death can be known.

MUMMIFICATION

Defn:- desiccation or drying up of dead body

modification of decomposition.

Mechanism:- mummification occurs because of
evaporation of body fluids in
presence of - warmth
excess of air ✓
Warmth.

→ ideal place = desert

Mummification:-

Exterior skin → interior viscera

smell → Rotten cheese

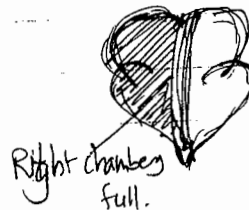
Time required:-

3 months — 2 years

Embalming of body:- artificial preservation of dead body.

ASPHAXIA

~~वासवरोध~~



Defn:- Death due to Failure of function of lungs.

Hypoxia:-

supply of oxygen to the blood & tissue

↓
reduced below normal working level

Stages:-

A) stage I - stage of inspiratory dyspnoea

= last about 1 min.
inspiration = difficult.

B) stage II - stage of expiratory dyspnoea & convulsions

= 1-2 min

Expiration = difficult.

n
S-
early stage
ammoniacal

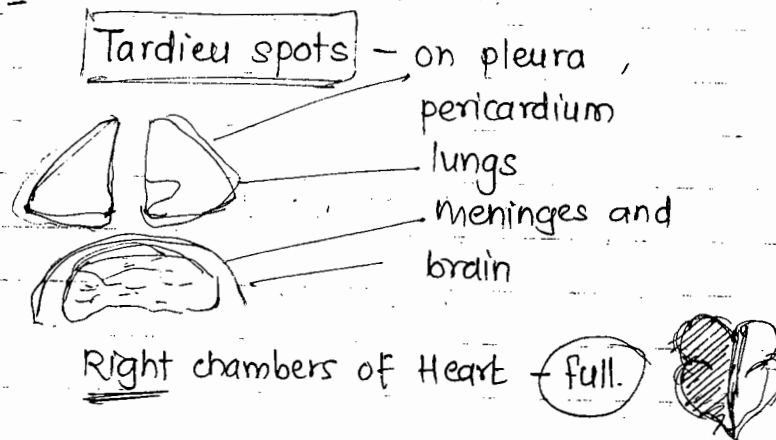
Stage III - stage of respiratory paralysis

2-3 min

PM Appearance:-

External:- cyanosis at nose, lips, tongue, ears & nails
petechial haemorrhages

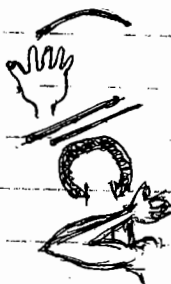
Internal:-



Classification of violent asphyxial death.

- ① HANGING - a complete ✓
b. Incomplete ✓

② STRANGULATION:-



- i. Ligature strangulations
- ii. Throttling
- iii. Bandsola
- iv. Craroting
- v. Mugging
- vi. Strangulation with knee or foot.



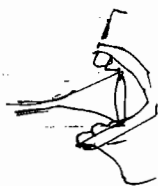
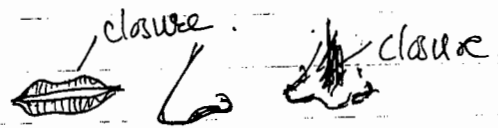
LBT/GSM

3) SUFFOCATION / crush asphyxia

Smothering

choking

1. Smothering =



2. Gagging =

Oropharynx obstruction

3. Choking =

Respiratory passage obstr

4. crush asphyxia = traumatic = compression of chest

5. Bandsola =

compression of chest = //

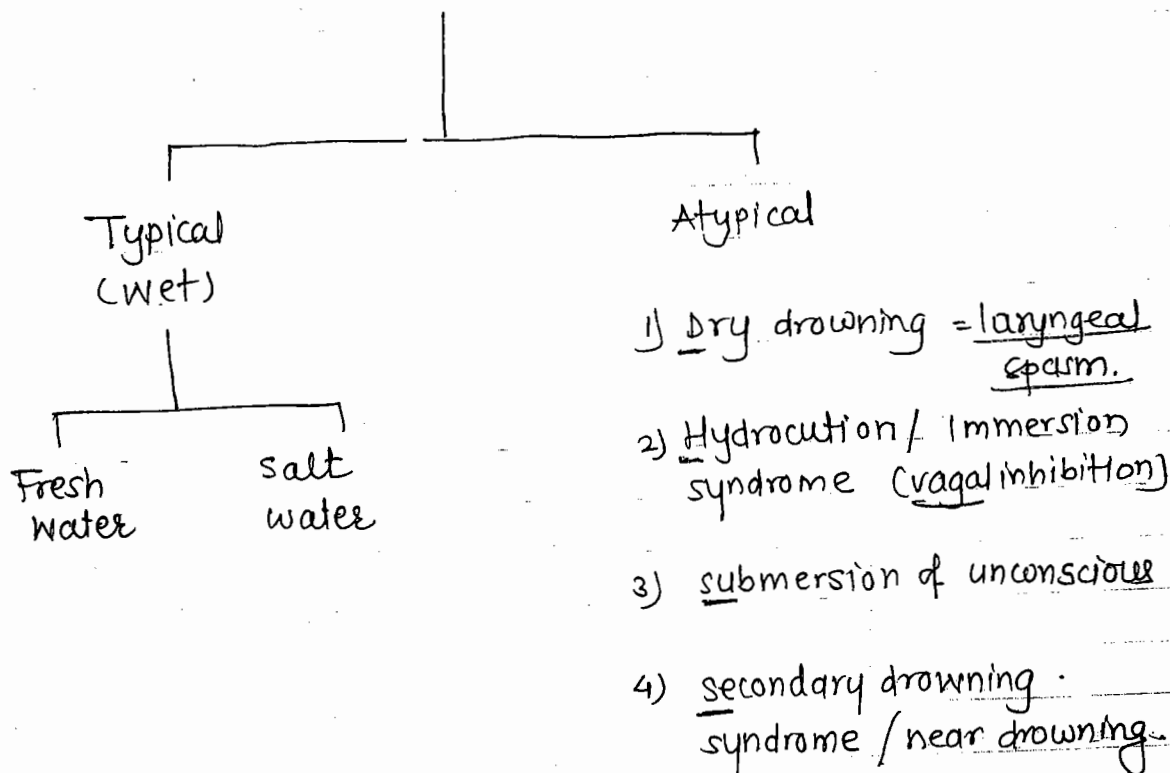
6. Burking =

crush asphyxia & smothering.

7. Irrespirable gases =

8. Burying alive = crush asphyxia

4) DROWNING / SUBMERSION / IMMERSION



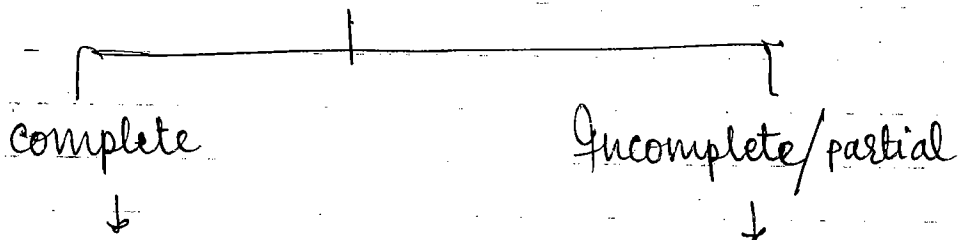
HANGING

= endogenous force

Defn: Constriction of neck by ligature due to suspension.
violent asphyxial death.

3-5 kg weight $\rightarrow$ sufficient to constrict
and occlude arteries.

Types:-



- High point
- feet above ground

- Low point
- feet or body part touching ground.
- auditory & visual hallucination

sign & symptoms:-

a. sudden death

b. partial constriction:-

i. Return of memory (Abreaction)

ii. mental confusion

iii. Auditory and visual hallucinations

iv. Convulsions.

Mechanism of death:-

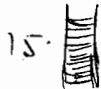
As per POLSON

* Weight



2 kg

③ 5 kg



15 kg



16 - 18 kg

vessels constrict

Jugular veins



carotid arteries

Trachea

vertebral Artery

18

Fatal period:-

Complete = instantaneous death.

partial = death may be delayed by
2-5 min

- dislocation of C. vertebra & asphyxia = earlier death

delayed in → venous congestion.

cause of death in hanging:-

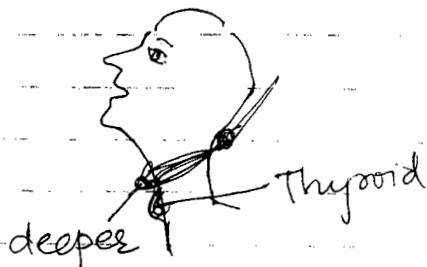
- ① Asphyxia ✓
- ② cerebral anoxia ✓
- ③ venous congestion ✓
- ④ Neurogenic shock ✓
- ⑤ # or dislocation of C. vertebrae
- ⑥ Injury to:- spinal cord
pons
medulla.

A] Local external P.M Appearance :-

External

① Ligature mark :-

present above thyroid $\rightarrow$ 80% cases



↓
oblique
symmetrical &
incomplete
deeper on side opp the
knot

Types of Ligature mark:-

Typical



- * upper half of neck
- * Above thyroid
- * oblique
- * Bilaterally symmetrical -
 $\angle$ of mandible $\rightarrow$ mastoid $\rightarrow$ occipital protuberance
- * possible in complete hanging.
- * knot - on post. part of neck

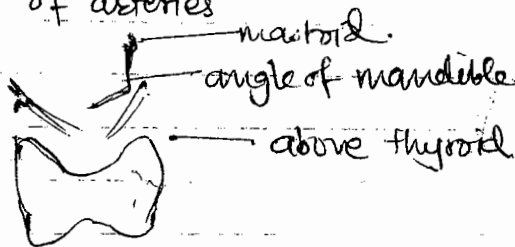


Atypical



any variations
from typical
ligature mark

- * max. possibility of occlusion
of arteries



Transverse & below thyroid $\rightarrow$ partial

Appearance of ligature mark:-

1) position :- Above thyroid $\rightarrow$ 80% cases.

2) surface:- abraded / contused / contused abrasion.

3) colour:- initially - yellowish brown

↓
later - dark brown
parchment like
Hard

KNOT

- fixed knot :- most hanging.

inverted V (Λ) shaped.

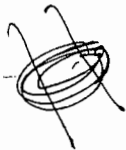
- Running knot:- / Noose / slipping knot.

site of knot:-



mark is absent at site of knot.
if knot is tied on lateral aspect of neck.

multiple rounds of ligature:-



multiple marks — seen if multiple rounds of ligature are made round the neck.

weight $\uparrow$ - mark better.

suspension time $\uparrow$ - mark better.

False ligature mark:- (pseudo strangulation)

Due to excessive fat on the neck, or ornaments around neck

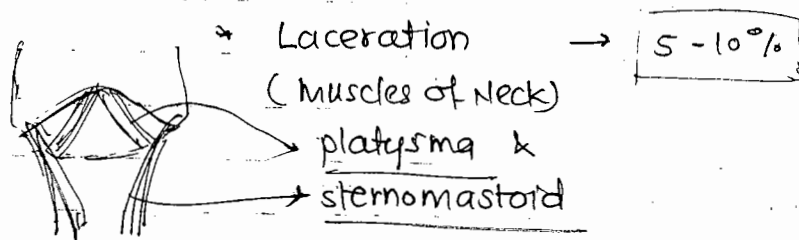
tight neck wear

sometimes false mark - may be seen on dead body.

3] LOCAL INTERNAL P.M. APPEARANCE.

Findings:-

- * under ligature → dry white & glistening (shining) pad of fat



- * Laceration of blood vessel wall → Rare in 5-10%



- * # of tracheal rings - in 5-10%



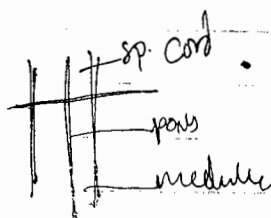
- * # of thyroid cartilage - 40%

- * # of costal cartilage - 10%



- * # of hyoid bone - Not seen

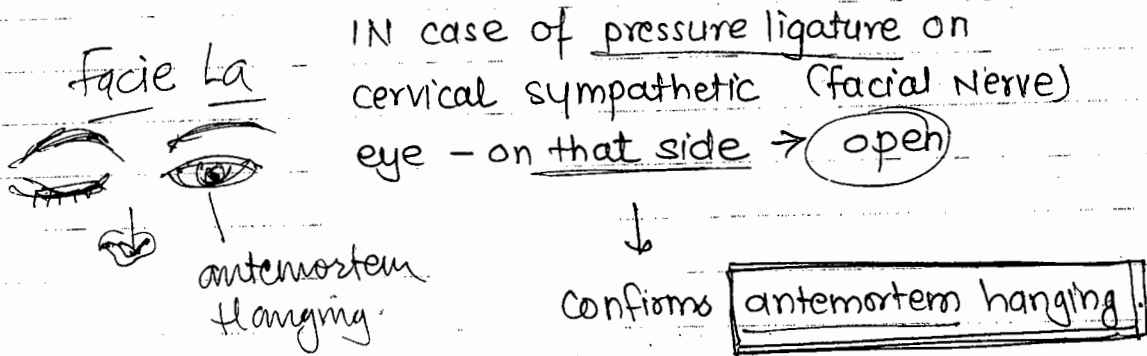
- * # C2-C3 C3-C4 C1-C2



- * Injury to spinal, pons & medulla.

Read each word & sentence carefully ok... ☺

La Facie sympathique :



Tongue → inside mouth
rarely protruded out
when protruded → brown colour.

ad of fat

Dribbling of saliva → from angle of mouth.
angle opposite to site of knot



↓
presence confirms
antemortem hanging.

During PM → seen as horizontal line on cheek



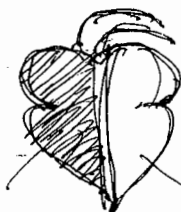
GENERAL EXTERNAL PM FINDINGS:-

La Facie sympathique.

GENERAL INTERNAL PM FINDINGS:

LUNGS:-

- congested ✓
- Rarely - emphysematous bullae present.



- Right chambers of heart,
pulmonary artery
vena cava } full of blood

Judicial Hanging:- (Justifiable homicide)

Lynching:- method of homicidal hanging
in (tribal) part of India.

STRANGULATION

Always Homicide

Defn:- Mode of violent asphyxial death

entry of air to lungs prevented by
compression of neck without suspension
of body.

(exogenous) force.

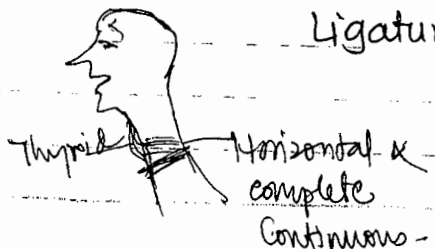
Types:-

LBT msk

1. Ligature strangulation
2. Throttling = manual strangulation / palmar.
3. Bansdola - Also type of suffocation.
4. Garroting
5. Mugging
6. Strangulation by knee or foot.

LOCAL EXTERNAL PM APPEARANCE.

external:-



Ligature mark - present.

* below or on thyroid

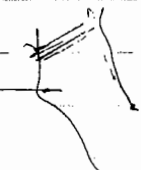
* Horizontal complete &
continuous

Strangulation

1. ON or BELOW
Thyroid 

2. Ligature mark:
Horizontal —
complete C
Continuous C.

Hanging

Above thyroid 

oblique /
symmetrical 
incomplete. incomplete

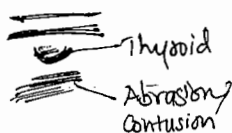
Findings in throttling (manual strangulation)

Injuries - due to thumb $\Rightarrow$ seen better

Due to finger tip - oval or circular
1.5 - 2 cm - diameter
contusions



Bansdola:-



Horizontal injury
abrasion / contusion on or below thyroid.

Garroting:-



Ant part of Neck $\rightarrow$ 'U' shaped ligature mark
Abrasion / contusion

Mugging & strangulation $\approx$ foot / knee

No typical injuries on Neck.



multiple, large, vague contusions on
ant. part of Neck.

INTERNAL

except throttling - under the mark
area is haemorrhagic

Frank bleeding - may present.

except throttling - laceration of muscles

muscle congestion.

of Hyoid bone - very common in throttling
Not in Hanging
more common in elderly

is of adduction type
(inward compression #)

* Medicolegal aspect of strangulations:-

Homicide by strangulation → common.

Ligature & throttling → commonest.

Bansdola - common in North eastern
states of India.

बन्सदोल -
North eastern
Name

don

2

SUFFOCATION = गुदमरण

Defn:- Mode of violent asphyxial death

entry of air into lungs → prevented by means other than compression of Neck & drowning.

Types:-

1. Smothering
2. Gagging
3. Choking
4. crush asphyxia = traumatic asphyxia
5. Bansdola - Also type of strangulation.
6. Burking
7. Irrespirable gases (strictly not violent asphyxial death)
8. Burying alive.

1. Smothering:-



Entry of air to lungs prevented by closure of nose and mouth.

eg. manual smothering
piece of pillow
mother hold child very tightly.
child born with coal.

2. Gagging:-



Blocking of oropharyngeal area by gag.

usually homicide

✓ common method of infanticide.

3. Choking:-

obstruction of respiratory passage

✓ Cafe coronary:-

sudden death while ^{cafe} eating food due to choking of larynx.

(death in cafe i.e. cafeteria)

No pain -

No cry. -

crush asphyxia = Traumatic asphyxia

penetrating

↓
Sharp pointed
object into
thoracic cavity

↓
causes pneumothorax

↓
Collapse of lung

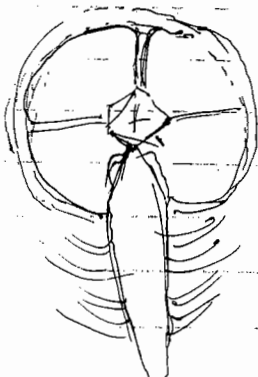
↓
Asphyxia

Non-penetrating

↓
crushing of chest

eg. 1. crushed betⁿ
vehicles

steering wheel injury :-



chest of the driver hits into the
steering wheel resulting in transverse
of sternum, # of ribs &

usually injury to pleura, lungs,
pericardium and heart.

Burking:- method used by Mr. Burk & Mr. Hare

used to kill people for selling dead
bodies to Edinburgh medical school
(during 1927-28)

sold (16) bodies to Dr. Robert Knox

Burying alive:- smothering + gagging +
choking + crush asphyxia.

DROWNING (Immersion) (submersion)

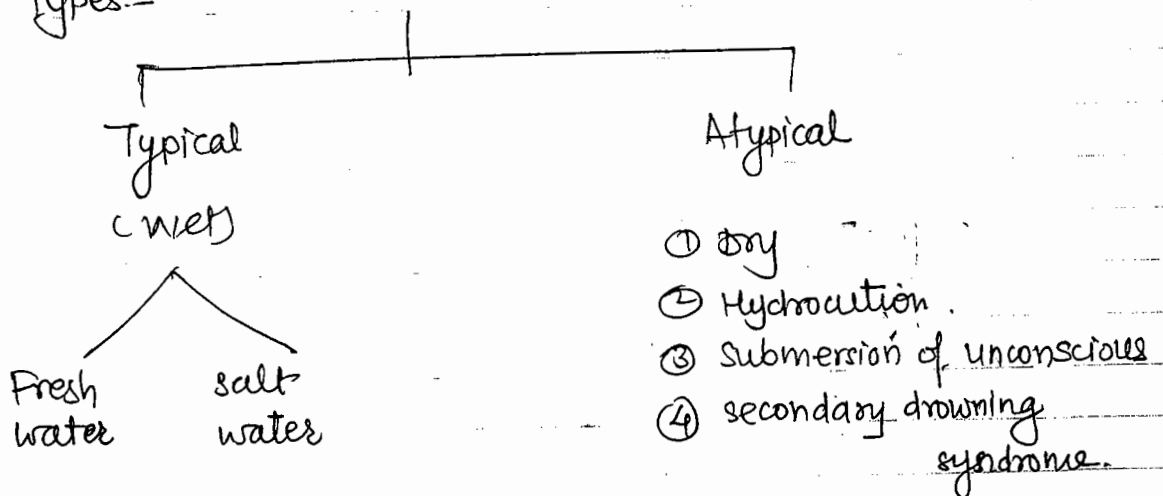
Defn:-

Mode of violent asphyxial death.

entry of air prevented by presence of water
or any fluids in lung & respiratory passage.

Death - submersion of mouth & nose is
require / Not whole body.

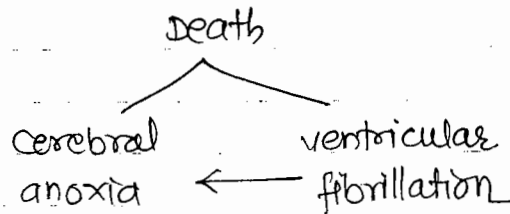
Types:-



Typical:-

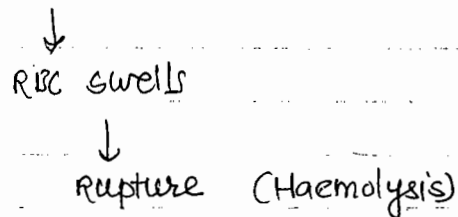
* fresh water drowning :- (NaCl - 0.6%)

Death in 4-5 min



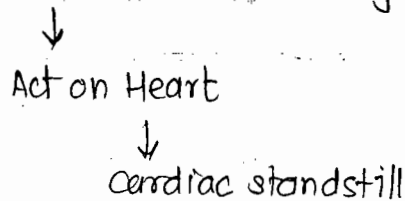
Hypervolaemia → Act on Heart.

Water enters into circulation



* Salt water drowning:- (NaCl > 3%)

Hypovolaemia Na⁺ & Mg⁺ ↑↑



Death < pulmonary oedema
myocardial anoxia

Death in 8-12 min

Atypical

- No water in respi. system.

1. Dry drowning:-

contact $\bar{c}$ cold water $\rightarrow$ intense
laryngeal spasm.



death

common in cold countries.

$\downarrow$
dry (हिवाळ्यात skin dry होते)

20% of total deaths due to drowning.

2. Hydrocution:- (immersion syndrome, vagal inhibition
submersion inhibition, cold water
drowning)

sudden death $\bar{c}$ cold water

death - due to vagal inhibition



cardio-respiratory arrest.

3. Submersion of unconscious

4. secondary drowning syndrome - death occurs after
removal from water
पाण्यातून काढल्यावर मरणे:

post drowning syndrome



complications are
more



condition $\rightarrow$ syndrome

* Stages and mechanism of drowning:-

Buoyancy - Natural tendency of body to float
तरंगण्याची क्षमता (उड्डना)

2-3 days - winter
1-2 days - summer

because: 10% of total body is fat

↓
sp. gravity
= 1.08

POLSON -

Unconscious results in 2-12 minutes.

unconsciousness → due to vestibular disturbances & tympanic haemorrhages.

Classical manifestations:- (प्रमुख लक्षण)

1) Froth:- Abundant white lathery tenacious froth at nose & mouth.

2) Cadaveric spasm:- plant, weed, sand or stones tightly held in hand.

3) Cutis anserina (Goose skin)

especially in cold water due to contraction of erector pili muscles

skin → granular

Washer women's hand or feet:-

- Body in water > 8 hours.

Fatal period:-

Hypoxia occurs in 1-2 min.

Death in Fresh water - 4-5 minutes

Death in salt water - 8-12 minutes

In atypical drowning,
person may be resuscitated - upto 20 minutes.

INTERNAL PM FINDINGS:-

5cm - Paltouf's haemorrhage :-



lungs

Sometimes due to rupture of
alveolar walls, large patches of haemorrhages
upto 5 cm - present on surface of lungs.

LUNGS:-

emphysema aquosum or

oedema aquosum (i.e. enlargement
due to water)

Ballooning of lungs:- During PM
lungs bulges out of
chest

lungs - pale in colour.

~~PALE~~ PALE

DIATOM TEST (PRESENCE OF DIATOMS)

Diatoms - unicellular algae present in water & in humid air

Transport of diatoms:-

Diatoms cannot be transported through stomach.



Opinion & inference:-

आस्थिमज्जा मध्ये
DIATOMS
↓
putrefaction.

Finding of diatoms in bone marrow, brain or liver confirms death due to drowning.

Importance of diatoms:-

- * presence of diatoms in body, confirms death due to drowning.
- * Drowning as a cause of death can be established, even in a decomposed or burnt body.

Treatment:- (चिकित्सा)

1) Blood volume restore → Fresh water - packed cell
Salt water - plasma

2) Symptomatic - fresh - vent fibrillation - defibrillation.

salt - pulmonary oedema - sedative

Fatal Periods:-

Hypoxia - 1-2 min

Fresh W.D - ~~8-12 min~~ 4-5 min

Salt W.D - 8-12 min

Other - upto 20 min.

Cause of death:-

- i. Asphyxia
- ii. major $\rightarrow$ F & S
- iii. Hypotension
- iv. Hypothermia
- v. Neurogenic shock

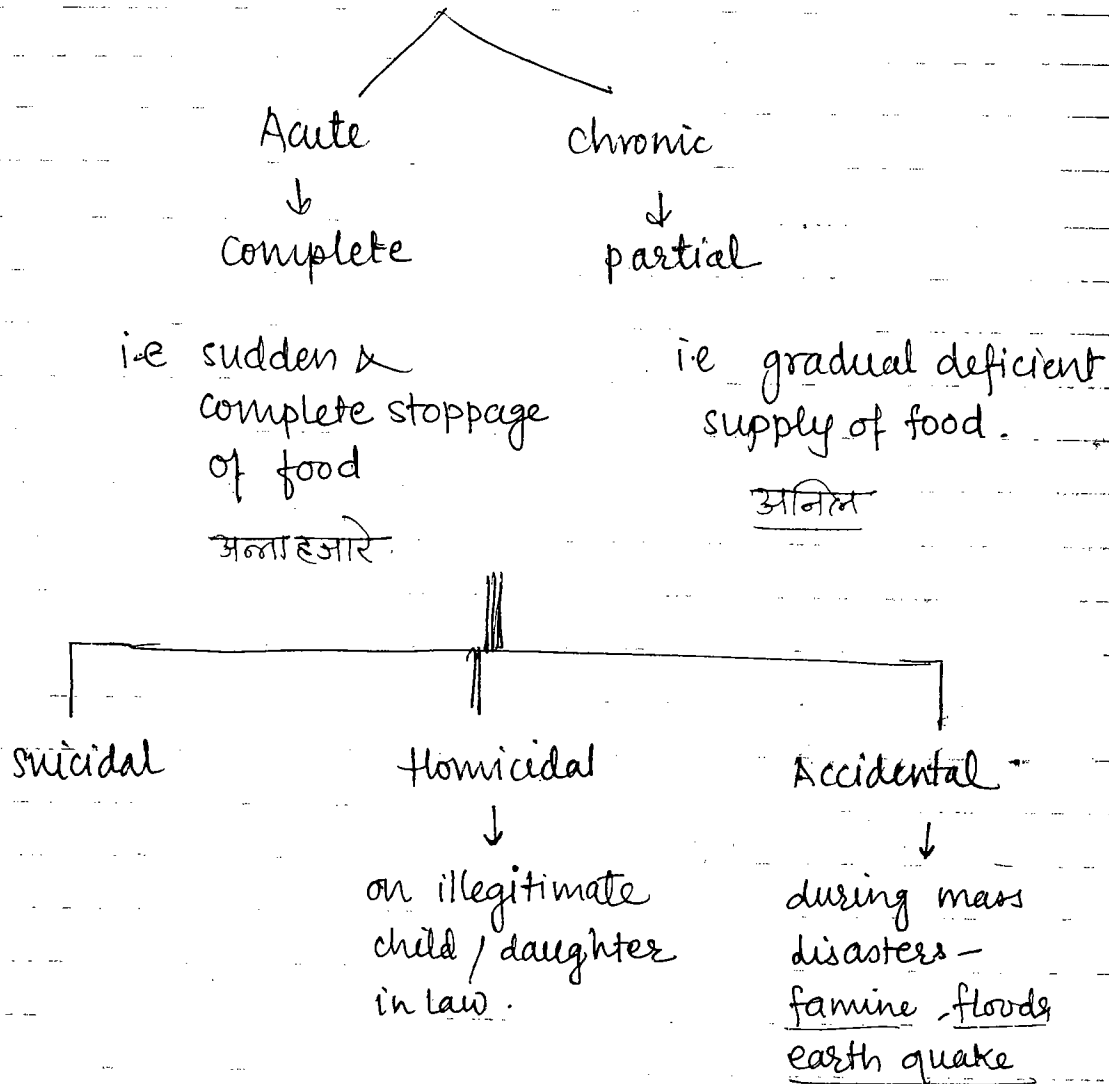
PM Appearance:-

- Ext:-
- i. Froth
 - ii. Cadaveric spasm
 - iii. Cutis Anserina

STARVATION

उपासभार

Result of actual deprivation of food or administration of unsuitable food.



Fatal period:-

↓ Food + water - 10-12 days.

↓ Food - 6-8 weeks.

24 - 32

PM :- Emaciation

Bed sore

Ascites.

EXPOSURE TO COLD

Hypothermia - body temp. below 35°C
 $< 35^{\circ}\text{C}$

Local injury

Trench foot /
immersion foot
(Wet cold)

↓
Exposure to severe cold $5-8^{\circ}\text{C}$
extremities are necrosed

Frost bite / dry cold

↓
 -2.5°C

↓
limb, nose,
ears, face
Necrosis

blister formation &
Gangrene.

Blisters

Erythematous patches - Few hours

soft blisters — 24-36 hours

Hard & black blisters — 2 weeks

Blisters deep upto bones - 1 month.

Manifestation

Ist stage

$32^{\circ} - 37^{\circ} \text{C}$

Hypothermia
&
shiver

IInd stage

$27 - 32^{\circ} \text{C}$

shivering stops

• Reddish patches

- RS c/vs
slowdown
metabolic
process

IIIrd stage

$\downarrow 27^{\circ} \text{C}$

fatal within
24 hr
convulsions
Hallucination
delirium &
death.

Treatment:-

Dry warming $\bar{o}$ hot water bottles at
 $40 - 42^{\circ} \text{C}$

$\downarrow$

Intense heat can produce
gangrene

Don't prick blisters.

pm lividity $\rightarrow$ Bright red.

pyrexia

G.B.

मोहर
लुकमालाफ
Green

EXPOSURE TO HEAT

- 1) Heat cramps / miner's cramps / stoker's cramps /
Fireman's cramps
- 2) Heat hyperpyrexia / Heat stroke / sun stroke

EXAMINATION OF STAINS AND HAIR

Blood stain :-

Chemical stains :-

pyrine - purple

G.B.

मोर
लुकमालाचिने
Green Test

1. Amidopyrine Test → purple colour
2. Benzidine Test → greenish blue colour.
3. Phenolphthalein test (Kastle Meyer test)
4. Guaiacum test
5. Leucomalachite green test → bluish green / peacock
6. Ortho-toluidine test (Kohn test)
ortho - कोरि नाई कू शकत. → blue / green colour
toluidin डाका 3 AMs produced.

Microscopic examination for R.B.C

Microchemical or Histochemical tests :-

- 1) Takayama haemochromogen crystal test
- 2) Teichmann's Haemin crystal test

डिक्कने PHD केती SEROLOGY मध्ये
PIG

SEROLOGICAL TEST

(for species identification)

1) Precipitin test:-

2) Haemagglutination inhibition test.

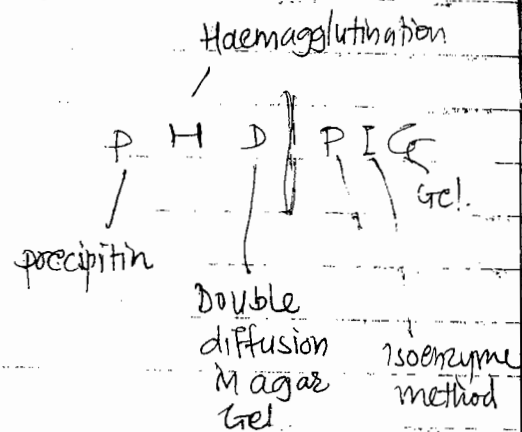
3) Gel diffusion test

4) Double diffusion in agar gel.
2x diffusion

5) precipitation of electrophoresis

6) Isoenzyme method

Serological Test
P - Precipitin
H - Haemagglutination
G -
D
P
I



SEMINAL STAINS

Chemical Tests:-

1. microchemical tests:-

FB

(a) Florence test - cloud of brown crystals(b) Barbenio's test - yellow coloured.

bar मध्ये yellow दार.

2. Enzyme tests:-

A.
C
E(a) Acid phosphatase > 10 K.A/ml

(b) creatinine phosphokinase (CPK)

(c) For glycoprotein

thiation

IC
GC!CPK > 400 unit.

CPK - levels over 400 units
indicate fluid is
Seminal

Test +ve upto 6 months.Isoenzyme
methodGlycoprotein:- P30 or MHS-5

Ammonium molybdate test

- deep yellow colour.

due to presence of

deep yellow colour.

INJURIES

Defn:

44 - Any Harm.
== FR

Injury:-

sec. 44 IPC

Any harm caused illegally to a person.

MLP असल
HURT असल

MLP
sec. 319 IPC

Hurt - defined as any pain, disease, infirmity or deformity in body part.

A 1
C 2
L 3
I 4
S 5
F

Criminal force - sec 350 IPC

Criminal MLD मोच मारतल.

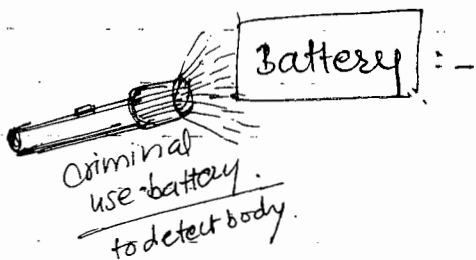
MLD

Assault -

sec 351 - 358 IPC

MLT - MLB

Fi



Battery :-

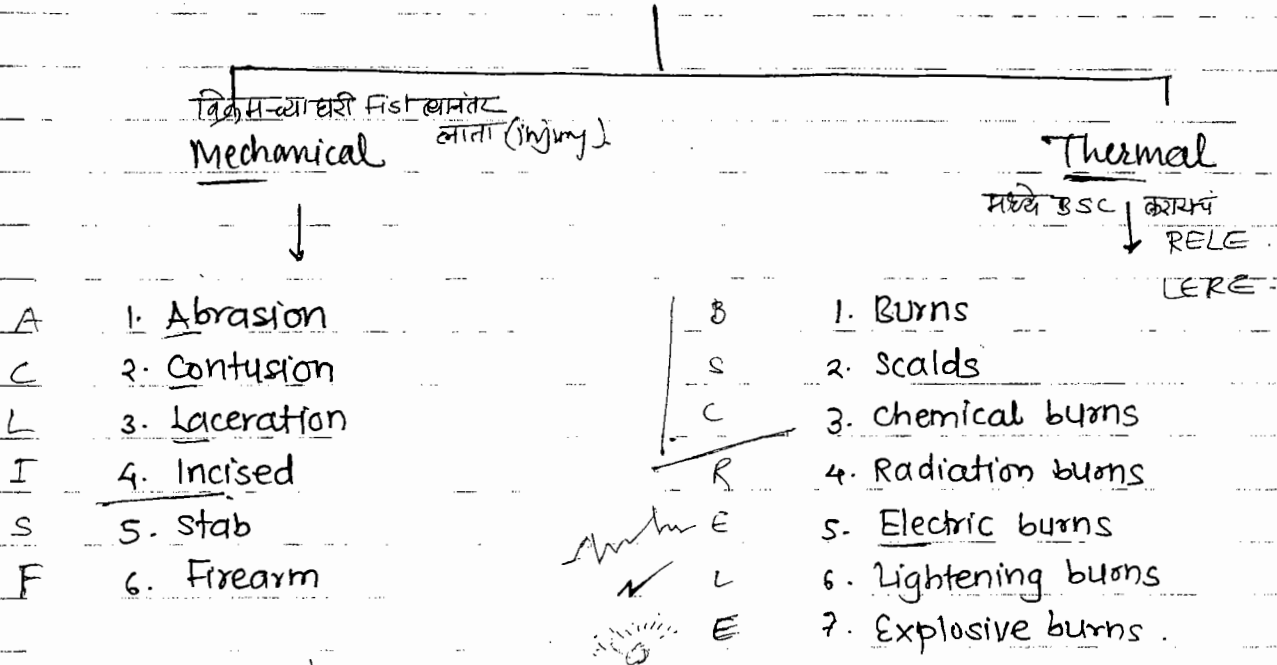
Actual use of criminal force on the body

Hurt - may or may not result.

CLASSIFICATION OF INJURIES

1) Aetiological classification

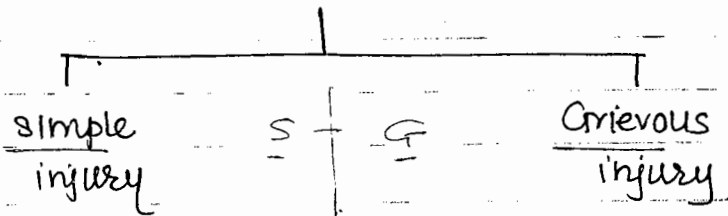
- depending upon method of causation of injury



Fist In A Co La
1 2 3 4 5 6

force

2. Depending upon severity of injury



3. Depending upon moment of death



4. Medicolegal classification

SHAFD

1. Suicidal wounds
2. Homicidal wounds
3. Accidental wounds
4. Defence wounds
5. Forged / fabricated / fictitious / false wounds

MECHANICAL INJURIES

* Abrasion (Crazes, Scratches)

superficial layers of epithelium or on mucous membrane.

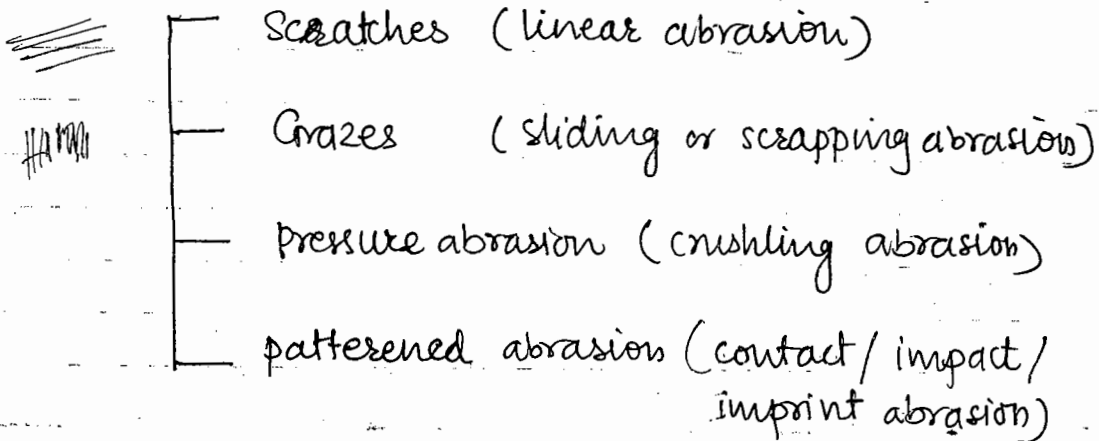
caused by - Hard
blunt
Rough objects.

Characters:-

Heal rapidly - in 1-2 weeks

After healing - NO scarring.

Classification of Abrasion:-



D.D:-

1. Excoriation of skin - around genitals caused by excreta in small children.
2. Bed sores
3. PM injuries - caused by ants marine animals.

CONTUSION (Bruise)

Defn - Injury present ^{S.C} sub-cutaneously or
under mucous membrane & epithelium intact.
blunt & Hard objects.

Characteristics:-

ecchymosis → present on external surface of body
or internal viscera

Contused abrasion / abraded contusion:-

may associated with abrasion 

CLW - contused lacerated wound

contusion associated & laceration.

patterned bruise:-

injury usually → Round in shape.

ectopic bruise:-

Site of bruise may be site of impact or
away from the site due to gravity
shifting of blood → ectopic bruise

संज्ञित
bury - गाड़णे

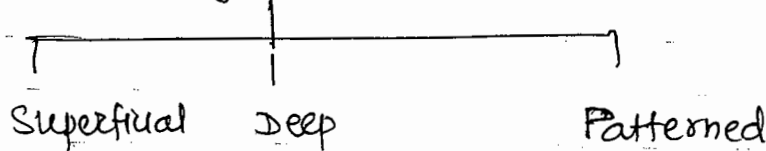
Spilsbury phenomenon:-

deep contusion
वर दिसते.
(दीडफुन)

Deep contusion may become
visible externally.

Contusion heal $\Rightarrow$ 1-2 weeks
7-14 Days

Types



Factors:-

- i. Age - better in child & elder
- ii. sex - better in female
chronic alcoholic

Pathological condition:- malnutrition
Rickets
haemophilia
HTN.

No contusion on

soles & palm.



Age of contusion:-

1 2 4 7 10 14
R B B G Yellow Non

Initially - Red
1-2 d - Blue
2-3 d - Bluish black / brown
4-7 d $\rightarrow$ Green
7-10 d $\rightarrow$ Yellow
10-14 d $\rightarrow$ Normal skin.

BBG 7-14
12 4 7 10 14

LACERATION - tear

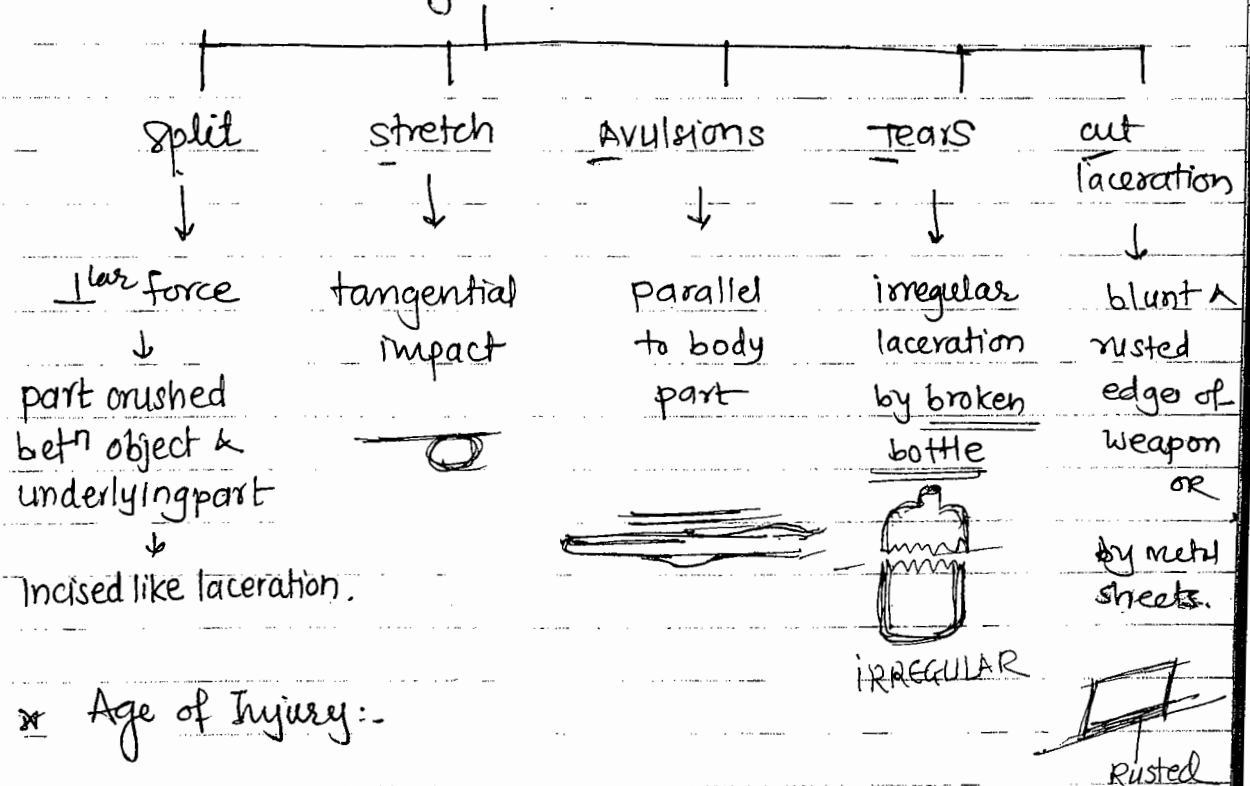
Defn:- injury caused by ^{Blunt} heavy, hard & blunt object.

Damage to some deeper layers. Muscles also.

& dislocation - included
Shape & irregular
margin

Types ⑤

T A S S C



* Age of Injury:-

bleeding - initially

clotting - after 12-24 hours

(pus) formation - after 36-48 hours

granulation tissue - after 1-2 weeks

(In absence of infection,
Rate of healing - 1 mm/day)

Healing - always by scarring

Fractures heal in - 4-8 weeks

M.L :- Homicidal / Accidental

- laceration - grievous injury

~~4-8~~ 28-56 days
1-2 months

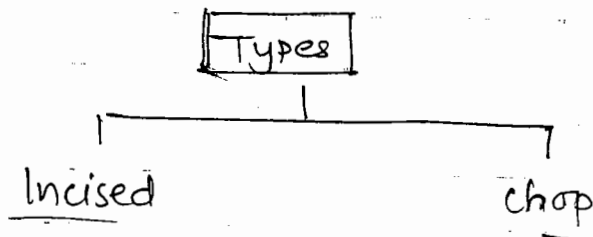
INCISED WOUNDS (cut/slash/slice)

②

Defn:-

injuries caused by - sharp edged object

Blade, razor, scalpel, knife



Characteristics:-

ie Length →

* length is the greatest dimension

* caused by - sharp edged weapons.

* chop wounds - violently hit.

Nerves are cut → paralysis

shape of injury → linear
usually elliptical or
spindle shaped

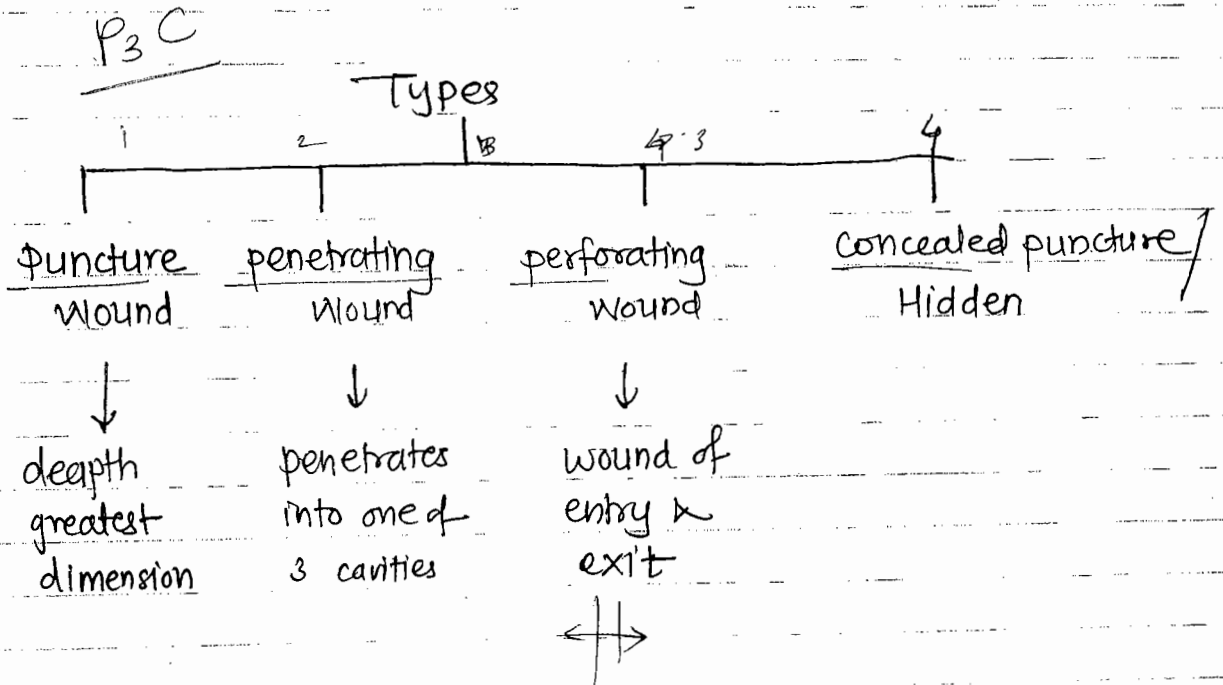
gaping of wound:- width of injury more
than thickness of blade,
due to elasticity of skin

Hesitation cut (suicidal) :- cut on neck, wrist or
ankle

STAB WOUNDS = भोसकणे

Defn.: Stab wound = puncture wound

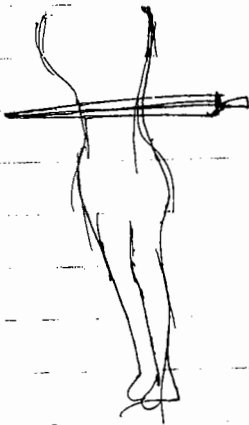
injury caused by sharp pointed weapon.



Characteristics of stab wound.

(a) General

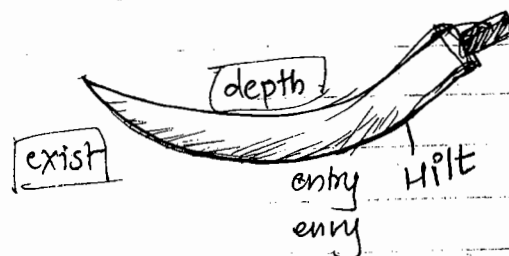
Depth is greatest dimension.



wound of entry and wound of exit may be caused.

Hilt mark - weapon hit thrust upto hilt mark

धारदार शस्त्राचा शिवट्या भाग



FIREARM INJURY

Defn:-

Injury caused by a firearm weapon
(basically - puncture wound)

Firearm weapon:-



an instrument, which propels out
a projectile because of pressure
exerted by gases.

Forensic ballistics:-

branch of science - deals with study
of firearms & their investigation.

FIREARM WEAPON

PARTS:-

1 2 3 4

BAMB

1. Barrel
2. Action
3. Butt/stock = Handle
4. Magazine

proximal end = breech end
- distal end = muzzle end

Mechanism of Action:-

velocity $\bar{=}$ which projectile leaves muzzle
end is known as muzzle velocity.

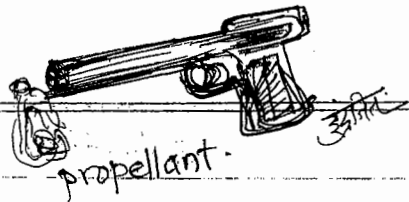
if it is $< 1100 \text{ ft/sec}$ (velocity of sound)

= low velocity

if more = high velocity.

DERMAL
NITRATE TEST
↓
Firearm injury
of accused.

propellant (Gun powder)



Classical gun powder = black powder

contents:-

C	1. charcoal	-	15 %	(Fuel)
S	2. sulphur	S -	10 %	(adds density)
KNO ₃	3. potassium nitrate	-	75 %	(supplies O ₂)

KNO₃
75%

single base - smokeless Gun powder + black powder
Nitrocellulose ✓

cell + gel.
double base - Nitrocellulose + nitroglycerine
cell + gly. (Gel.)

cell + gel + guan.
Triple base - Nitrocellulose + nitroglycerine + nitroguanidine
cell / gly / gua

Semismokeless powder - 80% black powder
20% Nitrocellulose

1 gm of ordinary black powder forms = 3000-4000
3000 cc of gases.

1 gm of Nitrocellulose yields = 12000-13000 cc
of gases

Gases formed - ~~CO, NH₃~~
CO N₂
CO₂ H₂
CH₃ H₂S

Derma Nitrate test:- False in contact with urine
Nitrate present on hand of A/cused ↑

projectile (missile)

projectile known as pellets / shots
(charge / load)

RANGE OF FIRING

1. Contact firing - upto 8 cm

point blank range of firing.

2. Close range firing - upto 2 yards
2 yards.

(1 yard = 3 feet)

3. Long range firing :- beyond (2) yards.

> 2 yards.

Strangulation - 6

Thermal - 7

Suffocation - 8

THERMAL INJURIES

Defn:- Injuries caused by some form of heat or caused by - chemical substance.

classification:- (B S C R E L E)

1. Burns
2. Scalds
3. chemical burns
4. Radiation burns
5. Electric burns
6. Lightning burns
7. Explosive burns.

pathophysiology:-

Damage to capillaries

Cerebral & pulmonary oedema

centrilobular necrosis of liver

Tubular necrosis of kidney

Haemorrhages in adrenals.

After about 1 week -

Result Cushing's
duodenal ulcers.

कैस जल्दी की
कुछ होता है
acute

GDU

Duodenal
Ulcer

Carboxyhaemoglobin level — Raised

carb-oxy-haemoglobin level ↑↑

(C O Hb)

Thermal injury

sign & symptoms of burn

surface area $\longrightarrow$ burnt

Sero-sang
1

After 1 day $\longrightarrow$ sero-sanguinous discharge

PUS
2-3

After 2-3 days $\longrightarrow$ (pus)-discharge

Age of Injury:-

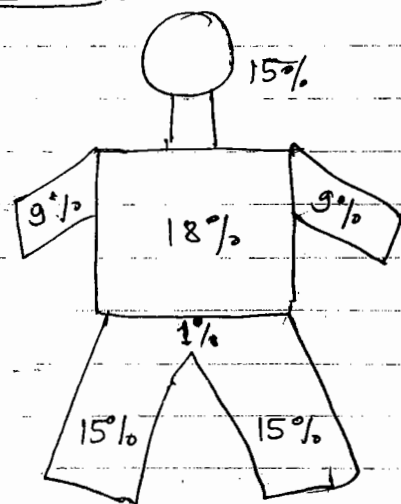
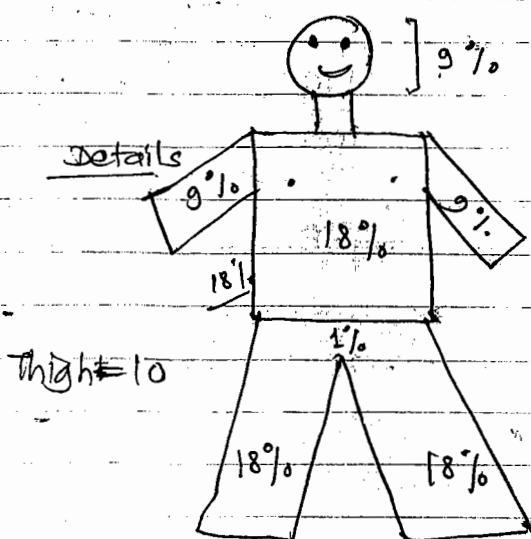
Fresh $\longrightarrow$ Reddish (black & sooty - kerosene & petrol)

0-1 Day $\longrightarrow$ Sero-sanguinous discharge

2-3 day $\longrightarrow$ PUS

After 1 week $\longrightarrow$ superficial slough is lost.

RULE OF 9 = Wallace's Formula.



Arm-4
Forearm-3

ADULT

CHILD < 5 yrs.

PERIOD
FATAL DOSE OF BURN

Death within

Due to :-

24 hours

N.S or suffocation

Neurogenic shock or

suffocation

1-2 days

electrolyte imbalance

hypovolaemia

2-10 days

toxaemia of burns

delayed

infections. ✓

PM APPEARANCE - BURNS

1MMP

External:-

* pugilistic (boxers) defence / fencing posture

Due to denaturation & coagulation of proteins



flexion of all joints & clawing of fingers, giving body a typical posture.

phenomenon occurs in both in antemortem and postmortem burns.

ELECTRIC BURNS = Joule burns

- endogenous burn

D.C

A.C

more dangerous

4-5 times.

- damage caused by current upto

- 50V

Types

CSF

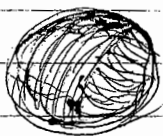
Contact
burns

spark
burns

Flash
burns.

Characteristics:-

1) Wound of entry:- Cat



Crater formation :- Non bleeding

thick

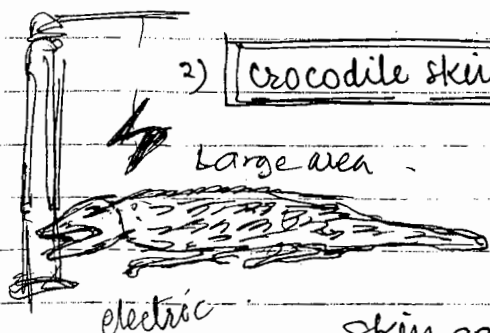
leathery

Cauliflower like structure

2) Crocodile skin lesion

Large area -

High voltage current may cause
burns over large areas of skin.



skin get coloured due to metallic pigments:-

Brass
G Fe
Steel

G B

B = Fe

Rlf - Cu

Green - brass electrode

Black - Iron Fe

Blue - copper Cu

LIGHTENING BURNS:-

1000 million volts.
 $I = 10,000 - 20,000$ amp.

current — D.C

voltage $\Rightarrow$ 100-1000 volt million volts.

current $\Rightarrow$ 10,000 - 20,000 amp.

Flash of light — lasts for $\frac{1}{100}$ th of second.

Area affected — 100 metre radius

Characteristics:-

 — बीज आकारक पदमे (जेहमी).

Filigree burns / arborescent burns /

arborescent markings / litchenberg flowers.

 Tree like



Multiple Ruptures of viscera.

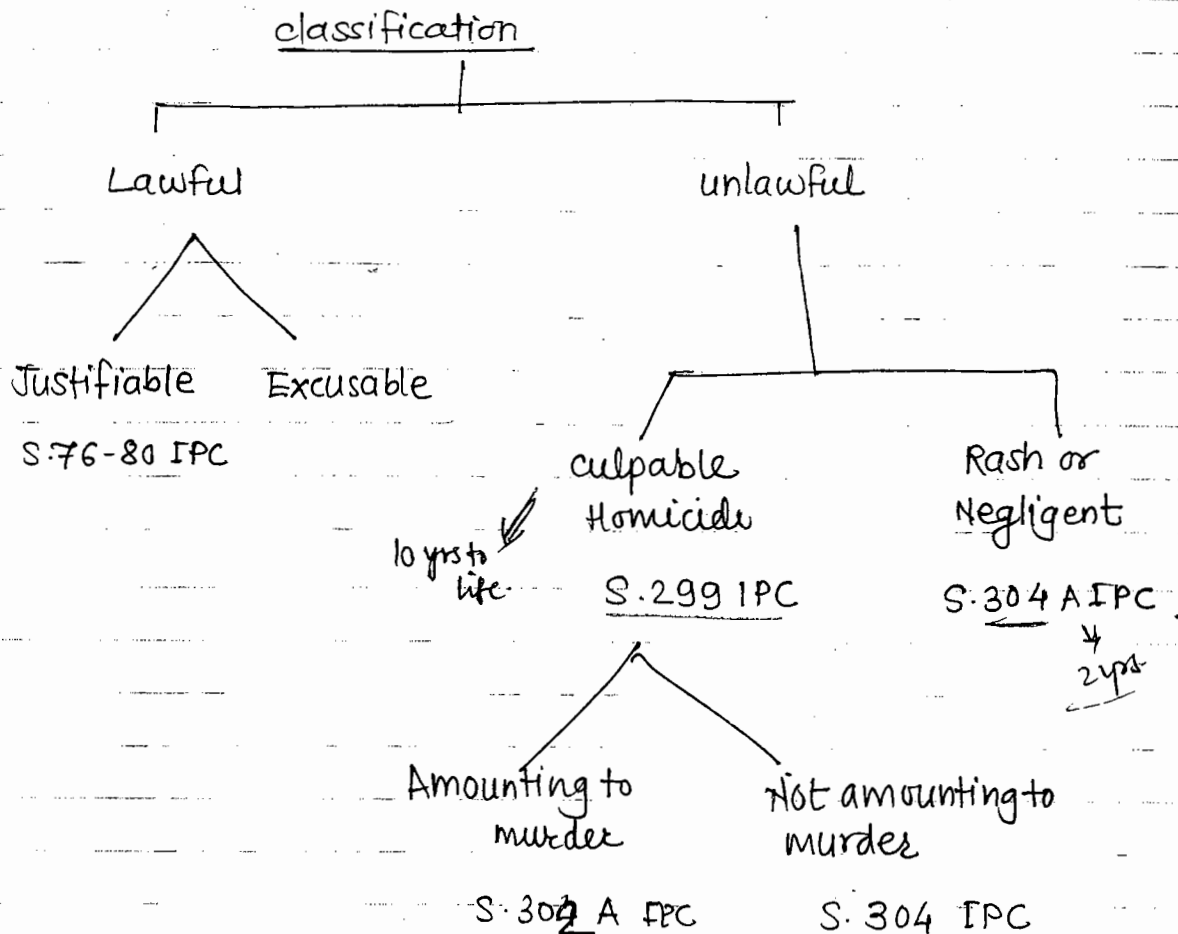
MEDICOLEGAL ASPECT OF INJURY

SHAFD

- 1) Suicidal
- 2) Homicidal
- 3) Accidental
- 4) Defence
- 5) Fabricated / forged / fictitious / false wounds.

HOMICIDE

Killing of Human being ^{by} another.



Excusable:-

Homicide, excused by law.

e.g.

i. Homicide - child < 7 years of age

S. 82 IPC

YN

Van

(उपस्थिति
प्रेरणा
Van मध्ये
मारायत्त)

ii. Homicide by insane - S. 84 IPC

B.R.

MAJ.

बुरा पागलाने मारले
मध्य)

iii. Homicide by one who is given
intoxicant against his will

S. 85 - 86 IPC

BE

BF

बालक $\leftrightarrow$ पालक
against will.

iv. Homicide by one suffering from
delirium tremens (syndrome
involving mental deterioration due
to chronic alcoholism

S. 85 - 86 IPC

Killing during self defence

S. 96 - 100 IPC

स्वतःला वाचकियासाठी
100 pg ला मारायत्त.

S. 96 - 100 IPC

pg - 100

Unlawful:-

Murder definition -

S. 300 IPC

punishment -

S. 302 IPC

IPC - sec 304 B -

Dowry death

हुंडा MORE
B दे.

MOR

punishment: 7 yrs to life.

dyadic death:-

person kills someone & suicide

दुसऱ्याला मारून स्वतः आत्महत्या करणे.

Honour killing:-

Killed because the victim brought
disrepute to family / community.

SIMPLE / GRIEVOUS INJURY

1) SIMPLE - injury - Not grievous.

2) Grievous:- sec 320 IPC

MNO
Grievous

① Emasculation

castration (cutting of testes)

② permanent privation of sight of either eye.

③ permanent privation of hearing either ear.

④ privation of any part, organ or limb of body.

⑤ permanent privation of functioning of any part, organ or limb of body.

⑥ Any # of bone or tooth or dislocation of joint or tooth.

⑦ permanent disfiguration of face or head.

⑧ injury endangers life or bodily pain
20 days.

प्राण

Dangerous Injuries:-

injury endangered to life

eg. Firearm injuries.
Depressed # of skull.
cut throat injury.

DANGEROUS WEAPONS:-

Sec. 324 & 326 IPC

Shooting, stabbing, cutting → Dangerous weapon.

VIRGINITY

Defloration — loss of virginity.

signs of virginity ⇒ vulva & breast

Medicolegal Aspect:- of Hymen & virginity:-

1. Hymen ruptured at time of 1st sexual intercourse

at (5) (7) (8) o'clock ± bleeding.

Carunculae Hymenalis:- Repeated sexual intercourse hymen opening ↑ in size.

Solapith:- weed introduced in vagina to rupture hymen in prostitute.

True & False / pseudo virgin.

PREGNANCY

416 IPC $\Rightarrow$ Guilty women / Homicide

postpon his capital punishment
for 6 months

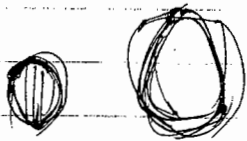
$\downarrow$
may change to life imprisonment.

Confirmatory signs:-

- i. Foetus Heart sound
- ii. palpation of foetal part.
- iii. Foetal movement.
- iv. Radiography & USG.

V
2

Signs in death:-



- i. As in living except confirmatory.
- ii. uterus enlarged. 30×25 cm.
- iii. wt gain upto 1 kg.
Foetus $\checkmark$
Placental at 1 cm.

Pseudocyesis / False / Phantom Pregnancy

Radiography

Spaulding sign $\Rightarrow$ present $\checkmark$

(overriding of skull bone)

* Spaulding sign $\checkmark \rightarrow$ overriding of 

Pregnancy

DELIVERY

Signs in death:-

- uterus larger & heavier.
- Fundal convexity $\uparrow\uparrow$.
- Body of uterus = $2 \times$ length of cervix.
- ext. oss enlargement.

See 319. Hm

~~INFANTICIDE~~

ABORTION

1/2/3th month

Induced termination of pregnancy.

usually at 1st, 2nd or 3rd month of gestation.

MTP - Medical Termination of pregnancy.

MMP
2015
MHSA.

MTP act pass on → Aug 2 - 1971

2/8/1971

KT + PKT

Indications

1. Therapeutic - आईव्या जीविका धोका :: pregnancy.
2. Eugenic - शारीरिक मानसिक or बच्चे death.
3. Humanitarian - Resulted from Rape
4. Social - Failure of contraceptive.
5. Environmental

Requirements for MTP

consent of Girl only ↑ 18 yr.

For MTP below 12 weeks - opinion of 1 RMP

MHSA 15. — 12-20 wks - opinion of 2 RMP.

Above 20 wks - MTP cannot be done.

cervix.

CRIMINAL ABORTION :- Beyond 20 wks.

Time - 2 - 3 month of Gestation.

Guilty punishable - IPC 312-316 & 511

M+N - MHP & 511

METHODS:-

① Drug

② Mechanical violence

③ ————— + Drugs.

DRUG - Commonly used in India for C.A.

① vegetable poisons - colostraxis | Jaypal | carrot
अक

② Abortion pills - Diachylon Diphenylphenylene

③ Purgatives - metal & mercurials.

Cupping :- In tribal area for C.A.

violently separation of placenta.

Natural Abortion

Incidence - 10-15% of All preg.

common - 1st trimester.

male child - common.

INFANTICIDE

Defn:-

unlawful destruction of newly born child.

Killing of child after delivery to till 1 year
after birth.

Clinically:-

Born at

Term born child - 40 ± 2 weeks

pre-term child - before 37 weeks

post mature child - After 42 weeks

Mature child - weight > 2.5 kg.

pre-mature child - weight = $1 - 2.5$ kg.
after 27 weeks.

Immature child - weight < 1 kg.
born before 26 weeks.

Infanticide (India) - Sec. 302 IPC

* Still Born

living in uterus just
before delivery

Delivery after 28 wks
of pregnancy

No signs of life.

Dead born

Death occurred in uterus

- Delivery normally occurs
2 days after death.

① sign of maceration
② decomposition

As per Indian law

if part of body of child is
outside the body of mother & if

he was alive $\rightarrow$ killing him is
infanticide.

HAASE'S RULE (Hess Rule) = Age at birth

For calculation of age of child.

upto 5 months

$$L = (\text{Gestational month})^2$$

After 5 months:-

$$L = 5 \times \text{Gestational month} \\ (\text{CM})$$

* Signs of live birth:-

(I) Establishment of Respiration

IMV

Lung
Life = water
जल है जीवत

* Hydrostatic (Raygat) - Ist life test

Flotation of lung on water
to confirm.

principle:-

to RO to LO

sp. gravity of non-respired lung $\rightarrow 1040-1050$

sp. gravity of respired lung $\rightarrow 940-950$

Changes in stomach/intestine:—

Breslau's second life test:

2nd life = ब्रेसलॉउ
ब्रेथ

In case of respiration occurred —
second ⇒ Stomach Floats on water.
(∵ air present in it)

Changes in kidney:—

uric acid crystals in pelvis — Not
confirmatory.

Medicolegal aspect:—

① Abandoning of child - below 12 yrs. leaves

IPC - 317 - Guilty . 7 years or fine

IPC - 302 - murder

(if he dead)

② concealment of Birth

IPC 318

- with intension of concealing
his birth.

2 year जेल / fine

③ SUDDEN INFANT DEATH SYNDROME (SIDS) /
COT DEATH /
CRIB DEATH

defn. Natural death of child (Healthy)

④ NON ACCIDENTAL INJURY OF CHILDHOOD /
BATTERED CHILD SYNDROME /

CHILD ABUSE SYNDROME /

MAL TREATMENT SYNDROME /

CAFFEY'S SYNDROME

CAFFEY SYNDROME
नेकल में हड्डी टूटने से
TORTURE का संकेत

टोन्सिल में
हड्डी टूटने का संकेत



• child who is victim of repeated beating / torture usually by his parents

• child group → 2-5 years.

Rare - in India

Characteristics

Caffey (1974) - described effects of violent shaking of child



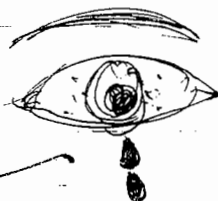
Results into
subdural
haematoma.



intraocular bleeding



WHIPLASH
syndrome



Known as -

Infantile whiplash
syndrome

SEXUAL OFFENCES

Interject
large

Defn.:-

unlawful sexual intercourse $\bar{c}$
any man, women or animal.

Classification

his
(A) NATURAL - RIADI



1. Rape
2. Intercourse of women in custody (s. 376 B, C, D IPC)
3. Adultery (sec. 497 IPC)
R.P.K. विवाहित स्त्री हानि R.P.K.
4. Deceitful cohabitation (sec. 493 IPC)
लगाये आमिष दाखवान - R.P.M.
5. Incent (Not an offence in India).
| sexual i.c relation $\bar{c}$ blood

(B) UNNATURAL - SLBB.



1. Sodomy
377 IPC
2. Lesbianism
(Tribadism)
(Not offence in India)
3. Buccal coitus
4. Bestiality

leeding
(C) Abnormal sexual perversions (classically not sexual offences).

RAPE बलात्कार

* Defn.:- sec 375 IPC

unlawful sexual intercourse
by - a man or women, his wife -
less than (15) years

any women < (16) years.

with or without her consent

OR.

any women of or above (16 yrs)

against her will, without her consent

OR

consent obtained by
illegal method.

MVHS Sec 376 IPC - punishment for Rape.

(7) years to life जेल.

Fine (376 (1) IPC).

SEC 376 IPC

376 IPC

custodial rape / gang rape / child rape sec. 376(2) IPC

- 10 yrs - जेल & fine

SEC 376 (B, C, D) IPC :- custodial rape
Not amounting to rape

upto 5 years + fine

Rape on wife → 4 12 years

upto 2 years जेल.

consent

Rape on wife during separation: →

upto 2 years जेल

sec 376 A IPC.

SEC 327 (2) IPC :-

Enquiry of trial under sec 376 IPC
will done in camera.

SEC 228-A IPC :-

Revealing identity of victim of rape
is an offence.

(upto 2 years जेल & fine)

SEC 354 IPC :- 2 वर्ष जेल.

Indecent assault to outrage the
modesty of girl. eg. stripping naked,

SEC 497 IPC:-

in Adultery,

sexual I.C with married women
even if with her consent.

જોન - ૫ વર્ષ.

SEC 493 IPC

જોન - 10 વર્ષ.

cohabitation caused by man
deceitfully inducing the belief of
future lawful marriage

LOCARD'S PRINCIPLE OF EXCHANGE

whenever 2 - bodies come in contact with
each other, there is exchange of material
between the two.

Examination of victim of Rape:-

Diagnostic:-

① Acid phosphatase levels - > 10 KA
units/ml.

in vagina

KA - King armstrong

② CPK levels:- (Creatinine phosphokinase).

levels > 400 unit/ml in vag

② Detection of semen specific glycoprotein

(P 30 or MHS-5)

detectable upto 27 hours after coitus)

OTHER K.N

1) Bobbit syndrome:- victim bite off or cut off penis.

2) Rape trauma syndrome:

- Shock ✓
- dismay ✓
- Non-specific anxiety ✓

Initial stage:- phase of disorganisation

After week:- phase of reorganisation. ✓

SODOMY / BUGGARY - sin of sodom
↓
Through Anus place creek.

Gerontophilia:- passive agent is an adult/elderly.

Paederasty :- passive agent is a child

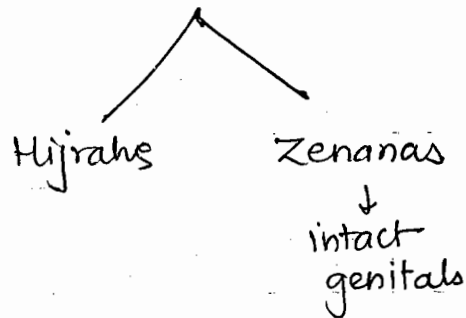
Catamite :- passive agent.

Sodomy punishment: -
377 IPC

Attempt - 511 IPC ✓

INDIA

class of male prostitutes:- eunuchs.
act as
passive agents.



BUCCAL COITUS:-

Sm of Gomorrah -
place.

LESBIANISM:- / Tribadism

Sm of Lesbos
place

paraphilia:- abnormal & unorthodox sex
play by using unusual objects or
part of body.

Nymphomania:- Perverted, uncontrollable
increased sexual desire

Satyrism:- (satyriasis) → male
enjoy having multiple partners

Frotteurism :-

Rubbing clothed genitals on other

eg. crowded places

lifts

fairs

punishable under - Sec 290 IPC

291 IPC

18.

agents.

ls

x
bjecks or

Tests

Test.

Marsh's }
Reinsh's }

Marquis test

Macewen's test

Mydriatic test
(for Atropine)

Green urine

ARSENIC

OPIUM

ALCOHOL

DHATURA

PHENOL

Shawn MARSH
Australia player.

Opium घेऊन पुराई ला
मार खावाला

Alcohol - mec वर
चालत नाही.
(Macewen's)

Atropin - mydriatic Agent

urine Green केली की
phenol नी धुवायचा
संजस.

Discussion

15. ATP reduced to - 85% result in Rigor mortis

16. Rigor mortis established fully after 12 hours.

17. pugilistic posture - Heat stiffening

पययि - Boxer's
defence

BURN मध्ये also.

18. Cadaveric spasm : sudden death

19. decomposition - late sign

Need required ?? warmth

due to formation
of sulphhaemoglobin

feature - Greenish colour

not in Right iliac fossa - Ext
Liver - Int

Mechanism

21. Post mortem Hydrolysis & Hydrogenation of
Body fats.

26. Hanging → anteroposterior compression #
C₂ C₃ C₄ level.

32. Drowning types

Typical
entry of
water

Atypical
finding of
froth &

Classical manifestation of drowning

cutis anserina = Goose like skin

<u>BURN</u>	—	<u>Rule of 9</u>	<u>Seperate %</u>
		Head	
		Neck	
		Abdomen	
		Chest	

Children < 5 years — children burn degrees.

Degrees of ~~bones~~ burns (Dupuytren's classification)

- 1° — epidermis
- 2° — epithelium
- 3° — superficial layers of dermis
- 4° — deep layers of dermis
- 5° — upto muscles
- 6° — upto bones

Unf. ^{PM} Appearance in Burns: —

pugilistic posture — due to coagulation of protein.

PM - lividity — dark red

curling ulcer —
curling ulcer.

2 cm diameter
1 week
in duodenum. 1st part

42. -

* Hyoid # - throttling (common in)

- Elderly more common

- Adduction type #

* # of cervical vertebra → uncommon.

55. Hydrocyanic acid

- Lungs

- Heart 100 ml blood

- $\frac{1}{2}$ of brain. (मास्तिष्क)

56. Decomposition

- slow in New born children still born

62. चिकित्सा चिकित्सक समस्या → दंड व्यायालय.

Blood circulation

Immediate sign:-

1. Magnus ligature Test - Blood vessels ligate.

2. Icard's Test

3. Diphenox Test

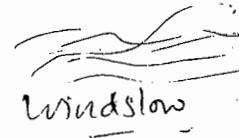
4. Finger Nail Test

Presence of Respiration:-

1) - Feather test

2) - Mirror test

3) - Winslow test



Removed — footer

सिरीजल - लवकर



* पूनिअवन नवकर:-

वत्सनाभ

Cocaine

chloral Hydrate

Na-Nitrate

* पूनिअवन प्रतिरोधी विषाक्तता:- (12)

- * पति करवीर ✓
- * धत्तूर ✓
- * कारस्कर ✓
- * Nicotine ✓
- * Florides ✓ F
- * Barbiturates ✓
- * phosphates ✓ P
- * साखिया ✓ Arsenic
- * Antimony ✓ Pb
- * पारद ✓ Hg
- * शिसे ✓ Lead

112
निम्न. वायु. Related

80: Frost bite.

limbs
Nose
Face
ear

Are involved

Temp $\Rightarrow -2.5^{\circ}\text{C}$

Skin — pale

blisters — usually present

* pmv lividity $\rightarrow$ Dark Red

82. 3 types of incision शवपरीक्षण. अपेक्षित

- V - विस्तृत परीक्षण.
- I -
- Y -

86. अफू $\rightarrow$ मास्तिष्क $\frac{1}{2}$ भाग

co $\rightarrow$ हृदयातील loop out ब्लॉक.
Lungs LD

कारिस्कर - spinal cord

 &  चा $\frac{1}{2}$ भाग
Heart Brain $\frac{1}{2}$ part.

Lacerated wound -
fleamy
Hard
blunt.

Injury to parts →
Dermis
Muscles
Bones
Internal viscera.

& dislocation - are included.

Shape - irregular
Margins - irregular.

92. FIREARM

~~VIMF~~ Test for metals -

KN

1. Neutron Activation Analysis

2. Spectrophotometry

3. Atomic absorption spectroscopy

4. Scanning electron microscope
- Energy dispersive
~~energy~~ spectrometry.
X-rays.

Lightening Burns:-

Multiple Ruptures of viscera.

filigree burns / arborescent burns)

markings / Lichtenberg flowers.

असु - सान्निपातज
नाडीवृण -

रुहेन - Blood - Cherry Red
CO - particles in lungs

१७० मृतजन्म - १:६०
जिवीतजन्म - १:३५

श्वसन स्थापनापूर्व Sp. gravity : 1040-1050
श्वसनोपरान्त : 940-950

संयोगज गर
गर विष

धातुनादूषित
दूषी विष

- एकत्रीकरण
- दोन/अधिक विधांचा संयोग.
 - कालान्तर विपाकत्वात.
 - कालान्तर प्राणहर.

दूषित करणारे धातुना ?
? स्थावर (जांगम) → योपेकी काही
कृत्रिम चा अंश PART इशियत
↓
शरीर दूषित (धातुनां)

FILE मध्ये
शाकण. CO₂ - Asphyxial

Strychnine - SPINAL
Ciclisimum

PERIPHERAL - Conium
curare.

Corrosives - Acids. All minerals & organic acids

Somniferin - Morphine

अफीम & morphine → somniferous.

Delinquent - Dhatur & cocaine

विशर्धित — स्पष्ट
मात्थे — समावेश
संदर्भ

● विष

लीक्षण — भूमिविर (शिथिलीकरण)
मोहग्रस्त (शिराच्या विक्रान्ती)

उष्ण — शारक्या गुणानां वाढवेळ. (रक्तपित्त ↑)

आशुकारी — प्राणाचे लवकर हरण करेले.

विकासी — क्रिसन = दोषघातुमलक्षपण.
(कुडेविकास ??) क्रिसन.

विशद — क्षालने विशदः।
अतिस्थित — स्फाडिकाणी थांबत नाही.

लघु — हातान येते
गती प्राप्त लवकर
[दुश्चोकेत्य]

अविपाक — दुर्बर
(लवकर पचन नाही
लवकर पसरते)

रूक्ष — वातप्रकोप

विष → रक्तदूषित → कफ → पित्त → वात
(सर्वप्रथम)

विमामा अधिक सेवन सहन → कफोद्भाह
अपस्मार
Hypnotic.

मादी - सुधा नृणा

Palsy - कुठल्या विषामध्ये ?

- वत्सनाभ
- Conium
- फेनाम



त्त 1)

कपील वर्ण रक्ताभिषिक्त वमन - संखिया

श्वेत वर्ण वमन

- नीलाजन (Antimony)

हरीत वर्ण वमन

- Digitalis.

जल वमन

Ammonia
phosphorus
वत्सनाभ

थांबत नाही.

Tetanus - Asphyx
कुचला
नीलाजन

प्रलापक -

झांगा
धतूर
मद्य
रूपूर
खुरासनी भोवा
Beladonna.

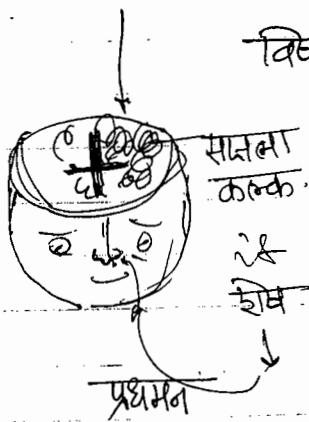
Antifibrin - श्वेत

दवाकित रजिमान - धातुमण

लोह/शुक्ल शलाकेने देह.

thick -

* उपाधान - डोक्यावर ठेवणे.



विष मारुतिष्काययन्ति पोहोचल्यावर

स्थानिके विष काढायचे

काकपद आकार घेते

रक्तमोक्षण

सातला कल्क
(सातला)

शेषविष निहेरण

प्रथम (परत शेष शहिल्यास)

UNKNOWN poisoning

2/3 जाला फांसण

एकत्रीकरण असल्यास

universal antidote

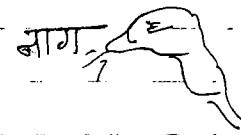
File → Mussel's formula

विषमवा अधिक सेवन सहन → कफोद्भाह
अपस्मार
Hypnotic.

मादी - शुष्क वृक्षा

Parelysis - कुठल्या विषामध्ये ?

- वत्सनाभ
- Conium
- फेनाश्म



रूपील वर्ण रक्ताभिषिक्त वमन - संखिया

श्वेत वर्ण वमन

- नीलांजन (Antimony)

हरीत वर्ण वमन

- Digitalis.

जल वमन

Ammonia
Phosphorus
वत्सनाभ

यांबत नाई.

Tetanus - arsenic
कुचला
नीलांजन

प्रलापक - कृंगा
घालूर
मद्य
कपूर
खुरासनी भोवा
Beladonna.

Antifibrin - श्वेत

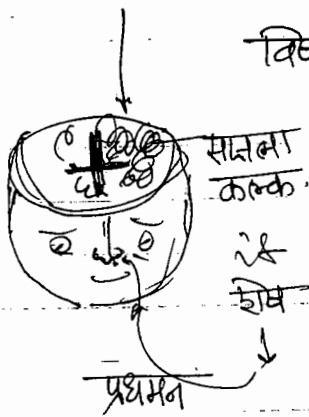
दार्दीकर राजिमान -

आयुषण

लोह/शुक्ल शलाकेने देह.

किंकर

* उपधान - डोक्यावर ठेवणे.



विष मास्तिष्कापर्यन्त पोहोचल्यावर

स्थानिक विष काढायचे

काकपद आकार घेते

रक्तमोक्षण

सातला कल्क
(सातला)

शेषविष निहीण

प्रथमन (परत शेष राहिल्यास)

Unknown poisoning

2/3 जाला फॉन्ड

एकत्रिकरण असल्यास.

universal antidote.

File → Mussel's formula

KN

forced diuresis - Aspirin
Barbiturates

आवा force for
diuresis

peritoneal diuresis - methanol
ethylene Glycol.

me-eth.
perito

forced alkaline diuresis

phenobarbitone
salicylates

phesa
Alkaline
diuresis

Haemodialysis
Blood

Barbiturates
Boric acid
bromide

G Glutathione

G-S-M

M methanol
S salicylates

Resin Haemodialysis - Theophylline

निर्देश

12g

विष वेगान्तर काष्ठत - इति उपचार +
घृत + मधु यदागु

शहिल्यास

F.D.

वत्सनाभ -

स्वरस - 250 ml

घृत - 1 gm

F.P - 1 तासे

शृंगी - वत्सनाभ → रेकन

कुचला/कारस्कर

strychnine
brucine
lochine

15-30 mg

→ चूर्ण - 2 gm.

OD. Tetanus
Hysteria

कल्प - विषातिन्दुक
वातगंजाकुश
आग्निदुष्ठी

F.P - 1-2 Hopyu

पूतिभवन प्रतिरोधी.

पेन्तुर - contents

- Hyocine - Hyoscine - scopolamine
- Atropine - Atropin

visual & auditory - Hallucination

क्षारम मावा - 60 mg - प्रोड - 4 mg - बालक.

बीज - पूतिभवन प्रतिरोधी

✓ mydriatic Test.

		F.D		Dose	
1	भाग	— शुष्कपत्र	भांगेची पाने.	—	10,000
2	गोजी	— शकदार पुष्पमांजरी	गांजा मांजरी.	—	8000
3	चरस	— शकसमान स्राव (नियसि)	चरस - नियसि.	—	2000

गुजा - 90 - 120 mg

- Atropin

24-32 तास

6/09/15

Sod formalin

अर्क प्रतिविष → पमाशः

अर्क - Contents - Caution

करवीर - मूकवृण - 15 gm - F.D

F.P - 24-36 तास

जाहत्याने नष्ट न होणारे - Nephrium Odourum

दूषी विष - श्लोक वधो-

→ वर्षाणानुबंधी

अनेक वर्ष तसेच राहते.
Long term पर्यन्त तसेच

आमाशयस्थ दूषी विष - वात कफ (आमाशय कफ स्थान)

पुक्वाशयस्थ दूषी विष - वात पुच्छ

गरविष - वामक → ताद्र ~~रक्त~~ रजत + क्षौद्र -

हस्त शुद्धी → सुवर्णमिश्रित
टमटु
होह.

पारद विषाक्त बाधा - आमाशय धावन

Hg

Sodium formaldehyde sulfoxylate

Dose

10,000

8000

2000

सांख्यी

सोमल

33

Arsenic

2-3 तास

श्लोफ्यार निषेध

Lead → antidote nt & also

घातक Dose

Lead carbonate -

साभ्र विषाक्तता - Greenish blue.

zinc sulphate - 15 gm

zinc chloride - 400 gm

Russel $\rightarrow$ 'V' आकार

Hydrophobia - DD

Tetanus

मासिक ज्वर

Bulbar paralysis

धिल्लू विषाक्तता

रि. अज्यघृत

अमृतघृत

Test for Toxicity detection:

H_2SO_4

Sulphuric acid

Carbonization

Carbolic acid

Free urine
Prussian blue Test

Arsenic

Marsh's Test
Reinsh's Test

Lead

Punctate basophilia

Opium

Marquis Test

Alcohol

MacEwan Test

CO Gas - spectroscopic Test.

(Spectroscopic)

Cocaine - $\frac{1 \text{ gm}}{2 \text{ Hrs.}}$

Dryness of skin mouth

Tachycardia.

ametics - contraindicated in
Nitric acid poisoning.

oxalic acid — Gastric lavage $\rightarrow$ lime water
halt.

most
chelating agent $\rightarrow$

used in metal poisoning.

form non-ionised complex with
metals.

BAL - British Anti Lethalite
(Dimercaprol).

effective in Arsenic poisoning.

EDTA -

Ethylene diamine tetraacetic acid.

effective against - Lead -
Mercury - पारद
Copper - ताम्र

contraindicated in :- Renal damage.

DFM - Desferrioxamine

effective against — IRON poisoning.

Barbiturates — ideal suicidal Agents.

Mercury poisoning :-

metallic taste
Blue line - gums
pink disease

OPP - used as pesticides in agriculture.

- Bradycardia
- miosis
- blurring of vision
- increased salivation
- diarrhoea.
- ~~convulsion~~
- chromogenic Tear.

Wrist drop
Radial Nerve

ARROW POISON →

- commonly applied on ARROW



Abrus

strychnine

Aconite

curare

Calotropis

Snake venom

Croton

Blue line = Burtonian

Lead poisoning Rx:-

Blue line -

Hg

Cu

Ag

Fe

Bismuth

Thallium

viscera preservation

Suspected virus - Glycerine

Histopathological Exam - formalin

Exam studies

- liq. Nitrogen

(liquid)

Imp

- 1) In all cases of poisoning excluding acid poisoning but including carbolic acid poisoning

⇒ Saturated salt solution

- 2) In all cases of acid poisoning excluding carbolic acid
(कार्बोलिक अम्ल सोडन) → Rectified spirit

- 3) Additional viscera preserved in —

Saturated salt solution.

Poison that resist putrefaction

- धतूरा
- Phosphorus
- metals
- strychnine
- Nicotene
- ENDRINE
- Alcohol
- oleander.

Ossification centre appear first before birth

1. Lower end of femur
2. ~~Lower~~ end of Tibia upper
3. Head of humerus
4. posterolateral fontanel closes.

DNA - sample → Blood & Hair

Rape cases - semen sample.

आयु अनुमानार्थ X-ray

Child - मणिकुश Joint

Adult - ~~st~~ shoulder knee

old - skull vertebra

post mortem

विघटनकेत.

Generally - Head

↓
Abdomen

↓
Thorax

